THE FOUNDRYMEN'S OWN MAGAZINE

MAY 1953

American Foundryman

POST *Convention*

SYMBOL of ORIGINALITY and DEPENDABILITY

COMPLETE MELTING, HEAT TREATING AND STACK GAS CLEANING EQUIPMENT

Designed—Manufactured
Installed and Operated

RESEARCH AND TESTING FACILITIES

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. MEMBER FEMA

Grindle

CUPOLAS ... Conventional, Closed Top and Top Charge
HOT BLAST SYSTEMS ... Direct and Waste Gas Fired
REVERBERATORY FURNACES ... Ferrous and Non-Ferrous, Duplex and Batch Melting
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HEAT TREATING OVENS ... Ferrous and Non-Ferrous
INSTRUMENTS ... Specially Engineered

For Details Write **GRINDLE Corporation**

P. O. Box 111, Harvey, Illinois, Phone (Chicago) WAterfall 8-7355

no other method of sand preparation can give you such uniform, thoroughly SATISFACTORY RESULTS!

For easier, more economical sand preparation, and better castings, use Crown Hill Seacoal, Federal Green Bond and Federal Sand Stabilizer as your sand additives.

If yours is an iron foundry and you are still searching for additives to provide the sand characteristics needed for your work—without requiring special sand or exacting sand control—you can stop searching! Do what hundreds of iron foundries do—use Seacoal, Bentonite and Sand Stabilizer.

Each of these materials has to do with distinct elements of sand preparation, so their use in varying amounts makes it possible to easily control all the important sand characteristics and to change them to satisfy specific requirements. By adding the proper amount of Seacoal, carbon content can be controlled at will and changed to suit the job. Through the use of Bentonite, green and dry strength of the sand can be varied as required. Adding Sand Stabilizer provides control of flowability, so molds can be rammed to proper hardness with a minimum of time and effort.

Special or fine grades of sand are unnecessary. Common lake, river or beach sand is often used for heap or system replacement. And there's no danger of sand grain size being thrown out of balance—as happens when offals of cores made of coarse sand, mix in with the fines necessarily used with emulsified asphalt or resin additives.

Yes, you'll get easy sand preparation—better castings—smoother casting finish—less-lumpy shakeouts with Seacoal, Bentonite and Federal Sand Stabilizer. *And these additives will cost you less than $1.00 per ton of castings produced!* A new bulletin tells all about this better method of sand preparation—write for your copy TODAY!

CROWN HILL SEACOAL

Produced by FEDERAL at Crown Hill, West Virginia. *High* in volatile combustible material, *low* in sulphur and ash content—basic requirements for a top quality seacoal. Ground or granulated to properly match the sand used.

FEDERAL GREEN BOND

Mined, processed and guaranteed by FEDERAL and unexcelled in uniformity and ability to develop green and dry strength. Truly the best of the bentonites!

FEDERAL SAND STABILIZER

A processed cellulose sand additive whose high combustibility allows sand to expand evenly to eliminate casting defects. It increases sand flowability to provide better ramming conditions and attracts moisture to broaden the safe moisture range. And it eliminates lumpy shakeout.

FEDERAL

The FEDERAL FOUNDRY SUPPLY Company

4600 EAST 71st STREET, CLEVELAND 5, OHIO

CROWN HILL, W. VA. • CHICAGO • DETROIT • MILWAUKEE • RICHMOND VA. • ST. LOUIS • CHATTANOOGA • NEW YORK • UPTON WYO.

IN TWIN CITIES Charles D. Gallaher 11850 S. Old Shakopee Rd. Minneapolis 20, Minn.

POURING-OFF

Combined conveyor-escalator pouring at New Idea, Coldwater, Ohio (Div. Avco Manufacturing Corp.) Photo courtesy of Bartlett Snow. Modern crane, portable weigh hopper and skip chargers also in use here.

Rigid, straight-line control from monorail to ladle spout insures quick, accurate spotting over sprue holes.

Faster • • • Safely • • • Profitably • • •

Much mechanical handling of hot metal does flow through basic, routine channels between cupola spouts and sprue holes. BUT, every pouring floor presents problems that are DIFFERENT! These DIFFERENCES may arise from variations in cupola-spout and monorail heights. DIFFERING, too, are heights of molds and pouring platforms. Speed ratios, between conveyor and escalator in the pouring system shown here, require the closest timing.

Prescribing for and designing to meet all these and related DIFFERENCES is specialized business which should be entrusted only with foundry equipment specialists. KNOWING HOW to engineer the over-all system into a smooth RECEIVING . . . DISTRIBUTING and POURING line is a result of MODERN'S thirty-five year's experience. It's a tested, profit-boosting service that's FREE to foundry executives who outline their problems on their own company letterheads. For information only you can use the coupon . . .

A MODERN, steel-shell, covered ladle may be equipped with a graphite liner.

MODERN

MODERN EQUIPMENT COMPANY
Dept. A-5 Port Washington, Wisconsin

FEMA

MAIL TO MY ATTENTION:

Catalog #150 — cranes, crane trucks, monorail, trolleys, switches, etc. ☐
Catalog #147 — metal pouring systems, ladles, linings, etc. ☐
Catalog #149 — shanks, pouring ladles, distributors, reservoir ladles, ladle trucks, etc. ☐
Catalog #147-A — cupolas, chargers, hot blast, air control, spark arresters, etc. ☐

Company .....
Street .....
City ..... Zone .....
State .....
Attention .....

MODERN REPRESENTATIVES IN ALL PARTS OF THE WORLD

The Convention —

Outstanding for number and quality of technical papers, the 1953 A.F.S. Convention hit a new high. Official Report on Convention Events appears in the May and June issues of *American Foundryman*.

American Foundryman

Volume 23 **May 1953** *Number 5*

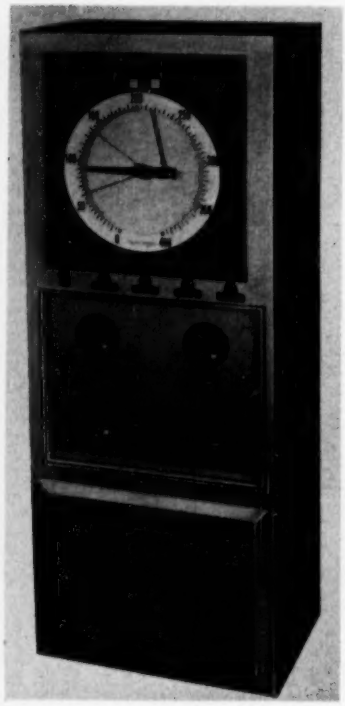
In This Issue....

Regular Features....

Published monthly by the American Foundrymen's Society, Inc., 616 S. Michigan Ave., Chicago 5. Subscription price in the U.S., Canada, and Mexico $3.00 per year; elsewhere, $6.00. Single copies 50c. Entered as Second Class Matter, July 22, 1938, under Act of March 3, 1879, at the Post Office, Chicago.

Published by American Foundrymen's Society

here's how



Here's how many foundries will broaden their application of automatic sand control. Harry W. Dietert Co.'s No. 3885 Sand Controller (above), when added to the Watertemp 3881 unit, and the No. 3884 Automull Sequence Controller, provides fine moisture control on the basis of working properties of sand. In addition to automatic sand mixing, continuous records of tests for green strength and green permeability may be obtained.

For more data circle No. 1 on card, page 17

Here's how Woodruff & Edwards Inc. Foundry, Elgin, Ill., reduced casting breakage by a full 50 per cent, while raising production 14.5 per cent, with cleaner castings, lowered noise level, improved working conditions, and more usable floor area. A single Pangborn LG Rotoblast table made these results possible, raising the rate to 1,523 tons of castings per-man-hour from 1,329 in just 30 days.

For more data circle No. 2 on card, page 17

Here's how Westinghouse Electric Co.'s Trafford, Pa. foundry is now saving more than $37,000 annually. A fleet of 17 Baker-Raulang industrial fork trucks have eliminated manual handling of bagged material, barrels, and patterns. More than $20,000 has been saved in labor alone, and storage capacity has been increased because of the trucks' ability to stack palletized material. Many indirect benefits have resulted in the Westinghouse foundry, including less damage to stored materials, improved housekeeping, fewer lifting accidents.

For more data circle No. 3 on card, page 17

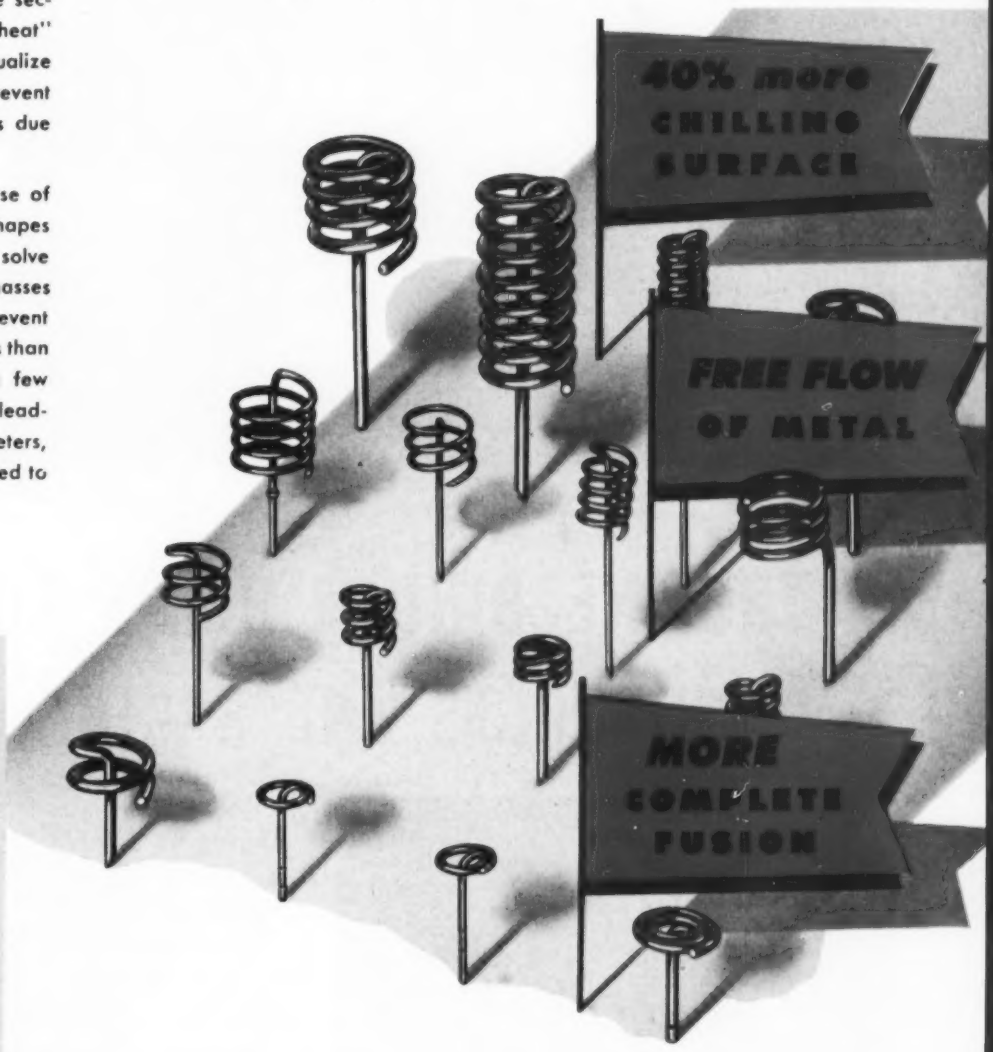
here's how . . . here's how . . . here's how . . . here's how . . .

fine FANNER CHILL COILS

YOUR BEST DEFENSE *against unsound castings*

● Castings with different size sections need "relief from the heat" in the larger sections to equalize cooling rate throughout—to prevent sponginess, checks and cracks due to uneven shrinkage.

Fine Fanner Chill Coils, because of their wide range of sizes, shapes and metals, enable you to solve cooling problems where large masses of metal are not involved . . . prevent rejects and get sounder castings than ever before. Illustrated are a few fine Fanner Chill Coils used by leading foundries. Gauges, diameters, coil and tail length can be varied to suit any job.



wrong

Showing how metal has kicked away from ordinary nail head used in light casting section.

right

Showing a perfectly solid casting with fine Fanner Chill Coils.

Write for complete catalog of fine Fanner Chills today.

THE FANNER MANUFACTURING COMPANY

designers and manufacturers of FINE FANNER CHAPLETS AND CHILLS

BROOKSIDE PARK **CLEVELAND 5, OHIO**

In Canada: CANADIAN FANNER, LTD. • Hamilton, Ontario

Workmen loading a Bullard oven with Truline-bonded cores weighing from 500 to 2500 pounds. Castings made with these cores are the basic components for the rugged, accurate, and dependable Bullard Cut Master vertical turret lathes.

TRULINE® BINDER HELPS BULLARD CUT COSTS AND BAKING TIME

Cores such as this, weighing 2000 pounds and more, are baked thoroughly overnight when bonded with Truline.

The economy and performance of Truline Binder in helping The Bullard Company's foundry at Bridgeport, Connecticut, to produce clean, sound castings tell the story.

Truline Binder reduces foundry costs in many ways. Cores collapse easily and shake out fast to give cleaner, smoother castings. That makes less cleaning and chipping—quicker movement of jobs off the floor.

Let us demonstrate how Truline Binder can help you. Our foundry service men will be glad to supply details.

Naval Stores Department

HERCULES POWDER COMPANY
INCORPORATED

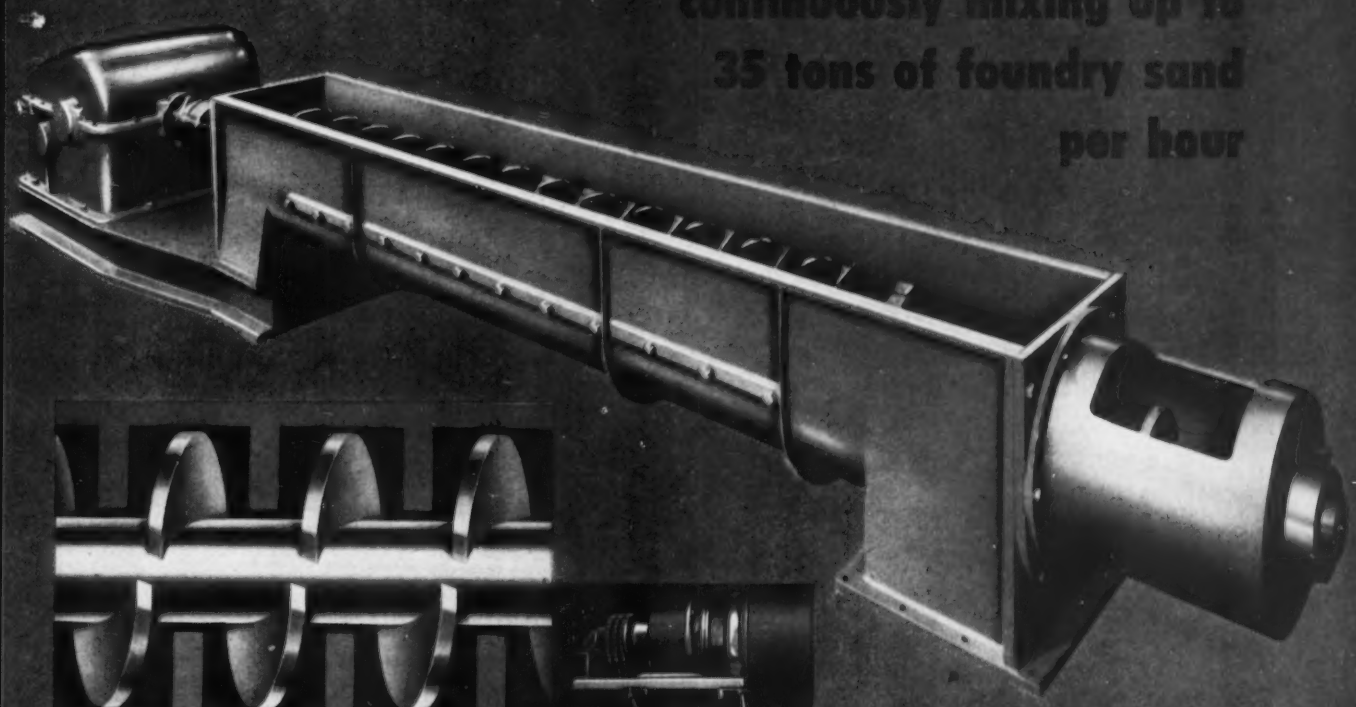
912 King St., Wilmington 99, Del.

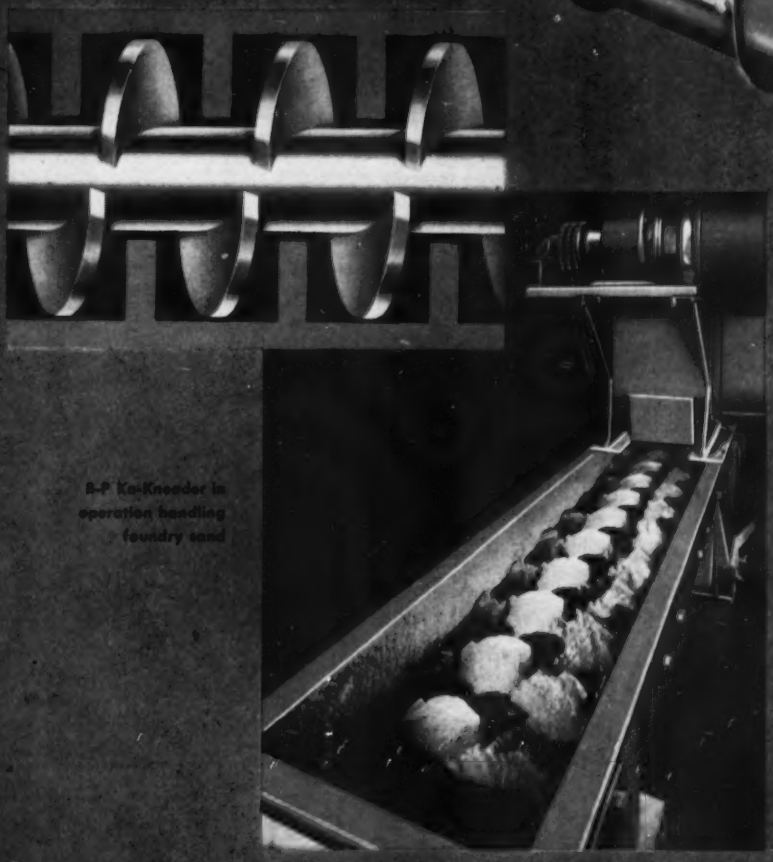
NF53-3

Baker Perkins Ko-Kneader

(LIST SYSTEM)

an efficient new unit for continuously mixing up to 35 tons of foundry sand per hour





B-P Ko-Kneader in operation handling foundry sand

With revolutionary Baker Perkins Type M List System Ko-Kneaders, continuous mixing of foundry sand becomes a highly practical operation. Essentially, the Ko-Kneader is a mixing worm revolving as well as reciprocating in a trough provided with kneading teeth in such a way that the mixing worm works as a single mixing machine with each tooth. The repetition of this operation, as the sand moves along the trough, completes the mixing and mulling. Baker Perkins Ko-Kneaders save considerable mulling time and also help to improve casting quality because the intense mixing action blends the sand uniformly and thoroughly. Baker Perkins Ko-Kneaders are ruggedly built for long life and dependable service. When used with specially designed Baker Perkins Feeders, operation of the Ko-Kneader is almost entirely automatic, resulting in substantial savings in labor costs. Consult a Baker Perkins sales engineer or write today for complete information.

BAKER PERKINS INC. foundry equipment sales • saginaw, michigan

For cleaner castings, improved sand recovery get a LINK-BELT foundry shakeout

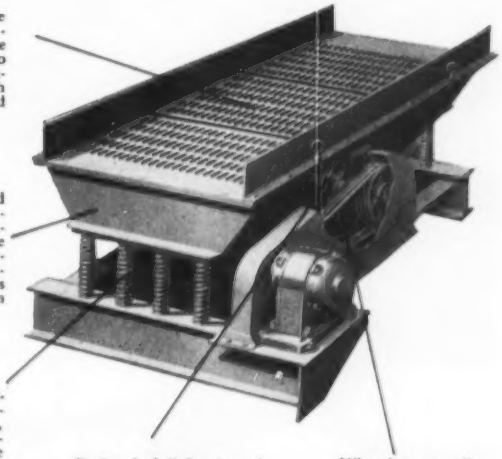
Dust control is facilitated when you centralize operations on an efficient Link-Belt foundry shakeout.

Increased output, improved working conditions also result when you eliminate manual shakeout

EFFICIENT design of Link-Belt foundry shakeouts permits continuous, straight-line operation for greater output. With operating parts recessed, there is ready access from all four sides.

High-speed, economical separation of castings from flasks and molds is achieved, together with faster reduction of sand lumps and temperatures. What's more, costly flask damage is eliminated . . . reclaiming of rods, gaggers and sprues simplified.

Both medium (shown at right) and heavy duty types have rugged construction plus full protection of all moving parts for minimum maintenance. Oversize, cartridge-mounted roller bearings assure accurate alignment. For complete information, ask your Link-Belt sales office for new Book 2438.



Removable steel perforated plates are fabricated to suit a particular job, with or without skid bars.

Built-in sand hopper requires minimum pit space to feed conveyor under shakeout, protects springs from sand.

Square-end helical springs carry all impact, transfer vibration to live deck, end overloading of all parts.

Enclosed, full-floating vibrator has automatic, centrifugally operated weights that limit motion during starting and stopping, reduce starting torque.

Vibration amplitude controlled by varying segmental weights in automatic unbalanced weight assembly.

LINK-BELT

CONVEYORS AND PREPARATION MACHINERY

MEMBER FEMA

LINK-BELT COMPANY: Plants: Chicago, Indianapolis, Philadelphia, Colmar, Pa., Atlanta, Houston, Minneapolis, San Francisco, Los Angeles, Seattle, Toronto, Springs (South Africa), Sydney (Australia). Sales Offices in Principal Cities.

13,261

REFRACTORIES — Melting... Cutting Out...?

Stock NATIONAL Carbon Brick and Shapes for Low-Cost Maintenance

"National" carbon blast furnace linings, of course. But HAVE YOU THOUGHT ABOUT CARBON for the other hot-spots where ordinary refractories conk out from high temperatures or slag-cutting? CARBON, the refractory, has no melting point and low affinity to molten metal and dross. In fact, even in *unfavorable* atmospheres, CARBON frequently outperforms other refractories on a length-of-life or cost-of-replacement basis.

Here are some of the places where "National" carbon and graphite can follow up their good work in the furnace...improve production, deflate maintenance cost, increase product quality and better the safety of equipment and personnel.

ON NEW APPLICATIONS OF CARBON, CONSULT NATIONAL CARBON'S ENGINEERS FOR PROPER GRADE AND DESIGN.

The term "National" is a registered trade-mark of Union Carbide and Carbon Corporation

NATIONAL CARBON COMPANY
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street, New York 17, N. Y.

District Sales Offices:
Atlanta, Chicago, Dallas, Kansas City, New York, Pittsburgh, San Francisco

IN CANADA:
National Carbon Limited — Montreal, Toronto, Winnipeg

Products and Processes

For additional information,

use postcard at bottom of page 17

New cut-type goggles

Welders' goggles specifically designed for all types of hot metal applications. Said to exceed Federal specifications for safety. Ample facilities for ventilation and to reduce fogging. Ballchain nose bridge with quick acting lever-type lock for easy adjustment. *Fendall Co.*

For more data circle No. 7 on card, page 17

Jolt squeeze pin-lift

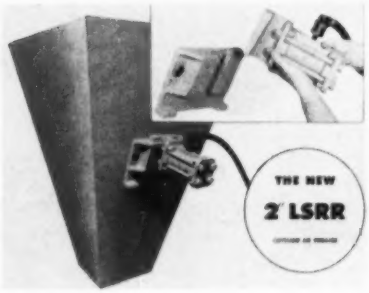
New improved line of jolt squeeze pin-lift molding machines by J & J, the most modern and efficient yet produced by this manufacturer. Positive slow and fast draw on same stroke with automatic vibrator control. Exclusive concentric draw design with single concentric draw cylinder guided by full diameter bearing area of squeeze cylinder provides smooth, accurate draw. Equipped with air-operated swinghead for left or right-hand operation. All working parts fully enclosed. Hardened and ground internal guides assure retained accuracy with minimum maintenance. Simplicity and ease of operation insured by two convenient pilot valves which control all operations, including air-actuated swinghead. An inexperienced worker can become a qualified machine operator after a few cycles of operation. The J & J 716-8 is designed for medium size production and semi-production work. Data on complete line of equipment available. *Johnston & Jennings.*

For more data circle No. 4 on card, page 17

Cab air conditioners

Two new units for air conditioning cabs on traveling cranes are available. The Aire-Rectifier is made in two sizes, for temperatures up to 115° F, and to 140°. Dependable in operation, low in maintenance, easy to control. *Lintern Corp.*

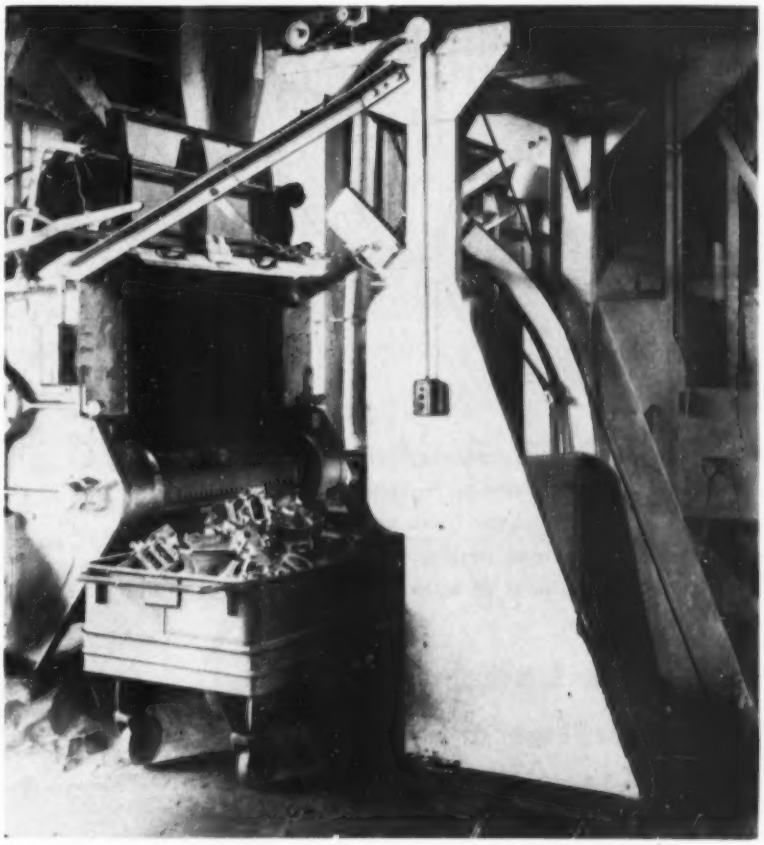
For more data circle No. 6 on card, page 17



Air vibrator

A new 2-in. piston diameter air vibrator, the LSSR, is very useful in eliminating arching, bridging and sticking in bins, hoppers, chutes, flasks, mining cars handling granular materials. New unit features quick, easy, simplified portability. Write for full information on this product and other vibrator equipment. *Cleveland Vibrator Co.*

For more data circle No. 5 on card, page 17



Heavy-duty casting truck

This very convenient foundry tool is easily adjustable to accommodate discharge door, and has extra-heavy flange reinforcement at both top and bottom to prolong truck life. All-steel welded body reinforced by three heavy steel cross braces and one longitudinal brace, welded to sill and box. Provided with ball bearing swivel casters on one end for easy maneuverability. Maximum rated capacity, 2,000 lb. *Sterling Wheelbarrow Co.*

For more data circle No. 8 on card, page 17

continued on page 14

LOOK no hands!

Split Second FOOT CONTROL

for FORWARD and REVERSE

Unique foot pedal control provides split-second change from forward to reverse. No clutching; no gears to shift. Operator's hands are free for scoop operation and steering. The time thus saved per trip adds up to many additional trips per day.

Bucket Loaders By 'Butler'

"the machines that serve you best"

CARSCOOP DIVISION BUTLER BIN CO.

940 Blackstone Ave. • Waukesha, Wis.

SALES AGENTS IN ALL PRINCIPAL CITIES AND FREE COUNTRIES.

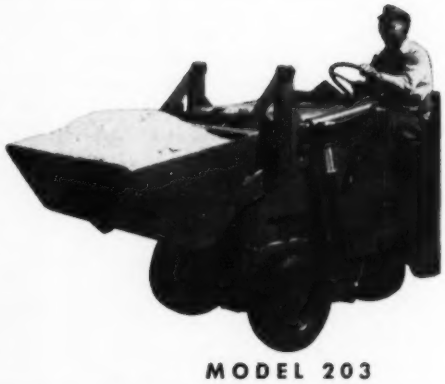
A high speed machine . . . travels up to 11 m.p.h., a great advantage in long distance transport. Use the 102 'Butler' to unload box cars of bulk materials. For factory yard work, too. (Ask for bulletin 250B)

MODEL 102

Where maneuvering space is "tight", the GA-9 Butler CARSCOOP with its short turning radius is a most versatile unit. Further, its low cost is inviting. (Ask for bulletin 250D)

MODEL GA9

A most versatile unit. Handles just about everything. An exclusive feature of bucket tip-back control aids in picking up full loads of free flowing material, such as grain or salt. (Send for bulletin 250C)

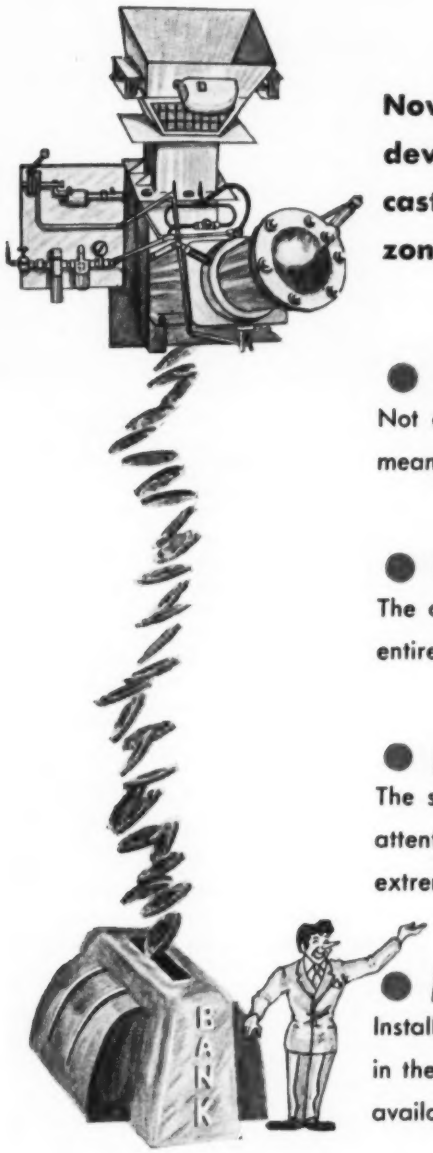


MODEL 203

In operations where noxious engine fumes are a health hazard, this agile electric motor operated Butler CARSCOOP is a practical answer. Operates on 220 or 440 volt current. (Specification bulletin 250E)

MODEL GA9E

NEW PROCESS *Solves* DISPOSAL of SHOP BORINGS and TURNINGS!



Now for the first time through a revolutionary new development Croft has found the answer to charging cast iron chips *directly* into the cupola at the melting zone.

● CROFT'S CAST IRON CHIP FEEDER

Not only solves the disposal of your waste borings and turnings but means greater savings to your foundry.

● CUTS FOUNDRY COSTS

The chip feeder unit saves up to $20.00 per ton of metal melted. It entirely eliminates briquetting or canistering of borings.

● ECONOMICAL AND SIMPLE OPERATION

The simple and rugged unit operates on 80 lbs. air pressure without attention. The Croft chip feeder involves low initial expenditure and is extremely simple to install.

● DON'T DELAY * * * * * INQUIRE TODAY

Installing a Croft chip feeder unit in your foundry is like putting money in the bank. Begin to reap your rewards at once. Complete units are available for immediate installation to suit your needs.

Inquire Representative United States and Canada:

MEEHANITE METAL CORPORATION

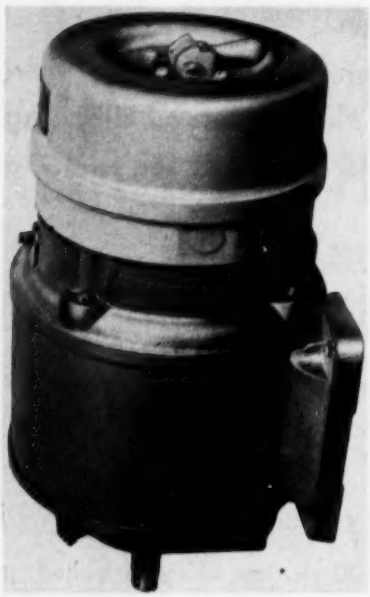
714 North Avenue New Rochelle New York

Products and Processes

For additional information,

use postcard at bottom of page 17

continued from page 11



Magnetic brakes

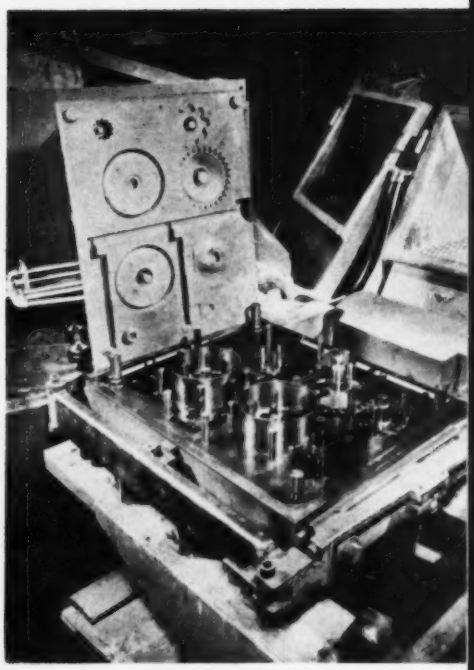
Fractional horsepower magnetic brakes for all standard AC or DC electric motors are now on the market, with torque ratings of 1½, 3, and 5 lb/ft. Brakes self-adjust for wear, but critical adjustment of torque can be made for precisely timed stops. Molded asbestos friction discs with high heat dissipation keep operation cool. *Dings Brakes, Inc.*

For more data circle No. 9 on card, page 17

New masonry saw

Here is a new abrasive blade that cuts masonry materials with speeds approaching those of diamond blades. It will slice through a 2 x 5 in. tile in only 11 seconds, through dry press fire brick in 5 seconds, face brick in 8 seconds, and concrete block in 17 seconds. Factory dressed cutting edge, protective blade blotters, steel blade guards are features of the saw. *Clipper Mfg. Co.*

For more data circle No. 10 on card, page 17



Shell-molding machine

A new 12-station shell-molding machine which can produce up to 500 shell molds per hour in a completely automatic series of operations. The machine is controlled by only a single workman. The equipment automatically proportions and blends the sand-resin mix, as it does every other step in the molding cycle. Unusual flexibility is afforded by a unique feature—patterns may be changed without stopping the machine. This unit greatly minimizes the element of chance from shell-molding operations. Efficiency, productivity, consistency of quality are all achieved with a high degree of dependability. *Mechanical Handling Systems, Inc.*

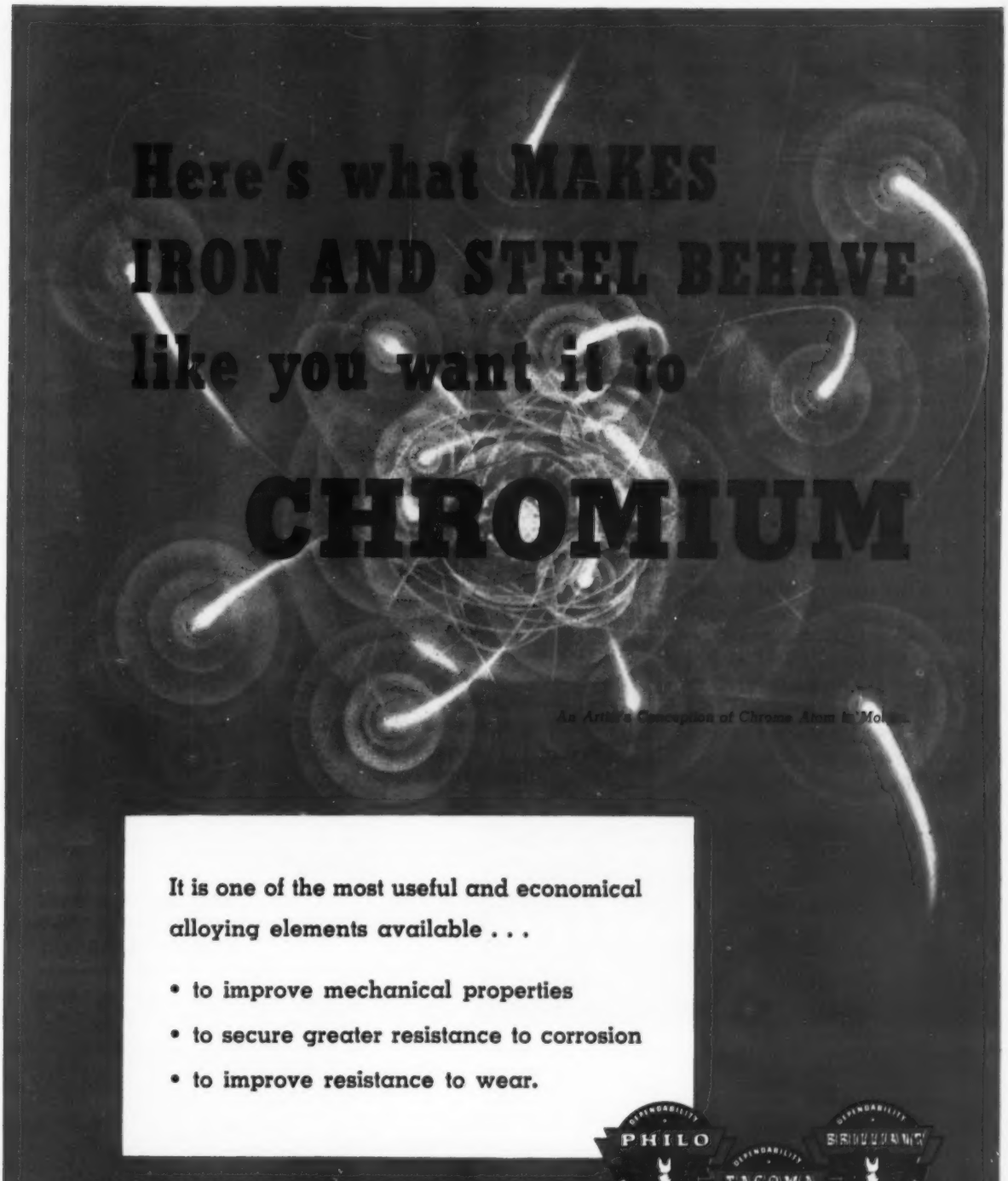
For more data circle No. 11 on card, page 17

continued on page 17

Industrial cleaner

Advertised as a "universal cleaner," Spray White cleans rapidly without heat, odor, fumes, solvents, fire-hazard or danger to skin. Applied with hand gun, it removes grease, oil, wax, gums, dirt, dye, ink, cutting soap, light carbon, and other industrial residue. Complete safety to all metals, plastics, rubber, porcelain, composition, concrete or wood. Virtually all cleaning jobs completed merely by spraying-on and wiping-off Spray White. Rubbing or scouring seldom required. *Kelite Prods.*

For more data circle No. 12 on card, page 17



It is one of the most useful and economical alloying elements available . . .

- to improve mechanical properties
- to secure greater resistance to corrosion
- to improve resistance to wear.

Ohio Ferro Chromium Products

STANDARD HIGH CARBON FERRO-CHROME
65-70% Cr. 4-6% Carbon

LOW CARBON FERRO-CHROME SILICON
33-42% Cr. 40-50% Si.
.06% C. Max.

FOUNDRY GRADE FERRO-CHROME
60-66% Cr. 6-9% Si.
4-5% C.

FERRO-SILICON CHROME
48-52% Cr. 25-30% Si.
1.25% C. Max.

FERRO-CHROME BRIQUETS
3⅓ lbs.
each containing
2 lbs. chromium

PHILO TACOMA BIRMINGHAM

Ohio Ferro-Alloys Corporation
Canton, Ohio

Chicago Detroit Pittsburgh Tacoma Seattle
Minneapolis Birmingham San Francisco Los Angeles

IMPROVE
Sand Control...

CUT
Scrap Losses...

DROP
Sand Temperature...
and

DELIVER *MORE* SAND—*FASTER!*

Here's what one of the efficient PEKAY Mixer-Mullers now in use is doing: increasing *Permeability*, giving a big boost to *Green Compression Strength;* maintaining correct *Moisture Content;* and delivering this *better* sand at an increase in volume per hour of 85%!

What's more, the amount of bonding clay and Bentonite added to the prepared sand has been *sliced in half.*

And *Maintenance Costs* are sharply cut because this smartly engineered unit is so easy to inspect and to service. *Power Costs* drop sharply, too.

CUTTER wheels are designed to eliminate lumps, give even distribution, provide consistent free-flowing characteristics.

Muller wheels put sand (delivered on conveyor belt from cutters) in perfect condition for molds. Capacity can be increased as desired.

END view shows compactness of 3-stage unit installation, approximately 20 ft. long, 2 ft. high. Single or Double-stage units are available.

Mixer-Muller
for better sand conditioning

THE PURCHASE PRICE IS LESS—AND INSTALLATION COSTS ARE MUCH LOWER. No excessive initial investment is needed to put the PEKAY Mixer-Muller to work in your plant immediately to save you money and give you faster production of a better product. Installation usually takes only about 100 man-hours of labor.

On every count, this unit deserves your careful consideration.

AND HERE'S ANOTHER LOW-COST WAY TO BETTER PRODUCTION

PEKAY AIRATOR

Easy to install—low initial cost—little maintenance

SEND FOR COMPLETE DETAILS, PRICES, TODAY!

Specialists in Foundry Sand-Handling Engineering & Equipment

PEKAY MACHINE & ENGINEERING CO.

869 N. SANGAMON STREET CHICAGO 22, ILLINOIS

M-T-MATIC Elevator Conveyor Buckets
TROFF-O-MATIC Conveyors

Gentlemen:

Please send me details and price information on the PEKAY Mixer-Muller.

NAME _____ TITLE _____

COMPANY _____

STREET & NO. _____ CITY _____ ZONE _____ STATE _____

Products & Processes

Fill out postcard below for complete information on products listed in these pages.

Continued from page 14

CONVENIENT FORM FOR ORDERING INFORMATION

Continuous rapping

A recent development by the manufacturers of Cottrell precipitators is a rapping system for continuous electrode cleaning. This magnetic-impulse (MI) rapping system delivers continuous rapping impacts of light and easily controlled intensities. The MI rapping method uses a solenoid-actuated rapper energized by a pulse generator, instead of a mechanical or pneumatic rapping device, as in other systems. The MI rapper is easily installed on any standard electrostatic precipitator used in electric, blast, cupola, open hearth and iron ore sintering furnace installations, and for fly ash, gypsum and cement applications in addition. The central pulse generator can deliver tripping impulses to each of the rapping units—up to 24 per precipitator—at intervals of 2½ seconds to rap the entire precipitator in 60 seconds or less. Power consumption is low: 300 watts or less per precipitator. Frequency of rapping cycle is controlled by distributor switch, intensity by a dial. *Research Corp.*

For more data circle No. 13 on card, this page

New cutting process

Dynarc, a new, patented process for cutting and piercing stone, cement, concrete and refractory materials, was recently marketed. An arc rod is used for the first time on non-conductive material and without ground connection, says the manufacturer. Operator has complete control at all times. Arc has all characteristics of super torch flame 5-8 in. long. Requires only a DC-welding machine of 400 or more amp. capacity. No compressors, air lines, oxygen tanks, pneumatic drills necessary. Pencil-like rod easily portable, quickly adaptable. Eliminates large quantities of heavy equipment. *Chemo-Tec. Div., Eutectic Corp.*

For more data circle No. 16 on card, this page

Mold release agent

A new shell mold release agent saves in cost, improves performance. Rapid, clean release from pattern plates and little or no build-up on molds are featured. Coverage is more uniform, molds are cleaner, no preliminary break-in or pre-lube of patterns is required, objectionable odors are removed. *R. M. Hollingshead Corp.*

For more data circle No. 14 on card, this page

Offset boring chuck

A new Samson heavy duty offset boring chuck with patented, positive dead-centering feature for drilling and milling, is in production. This tool eliminates the necessity of chuck removal, saving time on tool changes and ensuring extreme accuracy in boring, drilling, milling and other similar tool operations. The Samson chuck also features extra-large dial with micrometer screw, enabling the precision adjustment of offset and extremely accurate resetting for duplicating an operation. Tool is all-steel, with all moving parts lapped. *Last Word Sales Co.*

For more data circle No. 15 on card, this page

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53|5

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Scraper Storage Machines

General catalog (N) explains how roller bearing hoists are used by government agencies, public utilities and a large proportion of industrial plants in the U. S. and foreign countries for handling stockpiling and reclaiming of bulk materials. Book is divided into five sections. First dealing with roller bearing hoists for scraper storage machines, followed by section dealing with roller bearing hoists for scraper excavating machines. The third section refers to brake and clutch controls for hoists while the fourth deals with roller bearing hoists for tautline cableway machines. The last section deals with roller bearing hoists for slackline cableway machines. *Sauerman Bros., Inc.*

For more data circle No. 1 on card below

Specialized Tools

Illustrations and detailed descriptions of tools and tool sets provide complete data on standard and specialized tools in the 128-page publication. Two full pages are devoted to action photographs and descriptions of the various steps involved in the manufacture of tools. In addition to standard service tools for industry, special tools to meet specific requirements are also shown. *Cornwell Quality Tools Company.*

For more data circle No. 2 on card below

Flask Features

Brochure (64A) describing exclusive flask features and flask channels as well as other equipment used in foundries is now available. The 54-page booklet illustrates the different variations of construction of heavy duty flasks as well as various types of stub pins and hardened steel bushings for use with pins of various diameters. *Sterling Wheelbarrow Co.*

For more data circle No. 3 on card below

Selection of Motive Power

Motor and generator reference book is reprinted from the complete Electrical Reference Book published by the Electrical Modernization Bureau. This is not intended to be a text book on the broad field of motors and generators. It is rather a brief outline of information to assist in the selection of motive power to handle most industrial applications. *Allis-Chalmers Manufacturing Company.*

For more data circle No. 4 on card below

Desulphurization of Metal

A new booklet which lists, in non-technical language for the practical foundryman, the advantages of desulphurizing molten metal with soda ash. It also includes various recommendations for adding dense soda ash to the molten metal. The booklet is divided into three parts. The first part summarizes briefly the advantages of treating molten iron with soda ash. The second part gives details of the advantages, and the third is concerned with various methods of application. *Solvay Process Division, Allied Chemical & Dye Corporation.*

For more data circle No. 5 on card below

Palletizing Procedure

Recognizing the urgent need for uniform palletizing procedure, this manual offers a recommended policy. A careful survey of the various methods now in current use as well as some that are now obsolete was the basis of this recommended procedure. The manual covers: (1) The Standard Wooden Pallet, (2) Standard Pallet Load Protection, (3) Carloading Patterns and (4) Standard Wooden End and Side Gates. It is believed that the voluntary adoption of the suggested methods will greatly relieve the confusion which now exists in the palletized handling of refractory brick. *The Refractories Institute.*

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continued on page 146

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71	72	73	74	75	76	77	78	79	80
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Products and Processes

For additional information,

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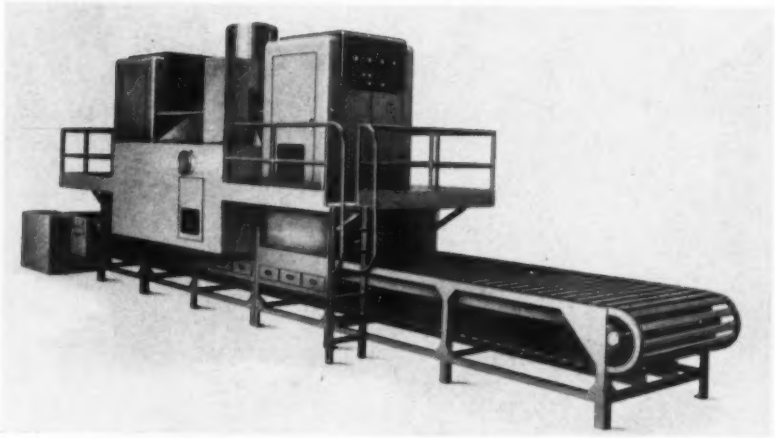
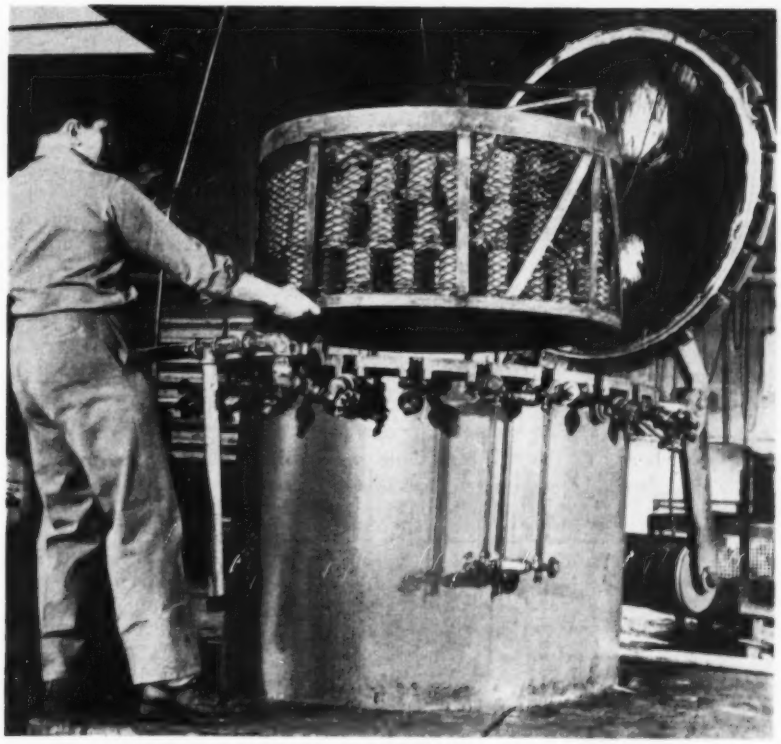
continued from page 17



Model 200 Foundromatic core dryer with supplementary heating units. Handles cores up to 800 lb. Rated at 3,000 lb cores/hr. at 3 percent moisture, equipment is ideal for producing with maximum efficiency and in large quantities.



Castings being lowered into autoclave for Metaseal impregnation. Complete system occupies comparatively small floor area, is self-contained.

Insert material

Cutinsert, a new rubber insert and overlay material for use on core box inlays, blow plate facing, parting line facing, and other foundry applications, has been recently developed. Treated surfaces resist abrasion, are oil proof. Will adhere at temperatures up to 300° F. *Martin Eng. Co.*

For more data circle No. 17 on card, page 17

Metal plate core dryer

This Model 200-A Foundromatic core dryer consists of a 60-kw output dielectric heater mounted on oven to conserve floor space. Designed to handle cores up to 800 lb on metal plates as well as in some metal dryers, thereby eliminating cost of changeover to plastic dryers. Supplementary heat for metal plates allows curing of cores in dielectric field with fast, complete cure. Model 200-A is rated at 3,000 lb cores per hour at 3 per cent moisture. The equipment is available for many foundry applications where large cores are required in quantity. *Allis-Chalmers Mfg. Co.*

For more data circle No. 18 on card, page 17

Mechanized impregnation

Manufacturer claims use of new Metasealing machine makes possible for first time 100 per cent filling of micropores in metal castings with successful results every time. System includes everything for complete, foolproof, economical sealing. Self-contained unit comprises autoclaves, high-vacuum pump, thermostatically controlled wash tanks, mechanical surging unit and power operated hoist. Machine is designed for simple one-man operation. Exclusive of baking oven, equipment occupies less than 40 sq ft of floor space. *American Metaseal Mfg. Corp.*

For more data circle No. 19 on card, page 17

HERE IT IS!

The Most Economical and Efficient Release Agent Available for Shell Molding. . . . . .

- ***Effective at lower concentrations***
- ***Gives positive release***
- ***More uniformly accurate shells***
- ***More stable, easier to use***

SPECIFICALLY designed for the shell process, Dow Corning 8 Emulsion costs less; goes further; gives positive release of more uniformly accurate shell molds. This new silicone emulsion contains 35% by weight of a special polymer is more effective at lower conce...rations in water. That further reduces costs, and gives even less build-up on patterns. Dimensional accuracy is retained through longer runs; pattern-cleaning costs are substantially reduced.

Dow Corning 8 Emulsion is nonflammable, noncorrosive and highly resistant to creaming or separating in storage or after dilution with either hard or soft water. And it is available at a new low price, 8% below that of previous emulsions. For maximum efficiency at minimum cost, follow the example of major producers of shell molds and specify the new Dow Corning 8 Emulsion. See for yourself! Send coupon for FREE sample.

DOW CORNING CORPORATION, Dept. AV-5
Midland, Mich.

Please send me Free sample of Dow Corning 8 Emulsion
Data on Silicone Release Agents for the Shell Process

Name _____

Company _____

Street _____

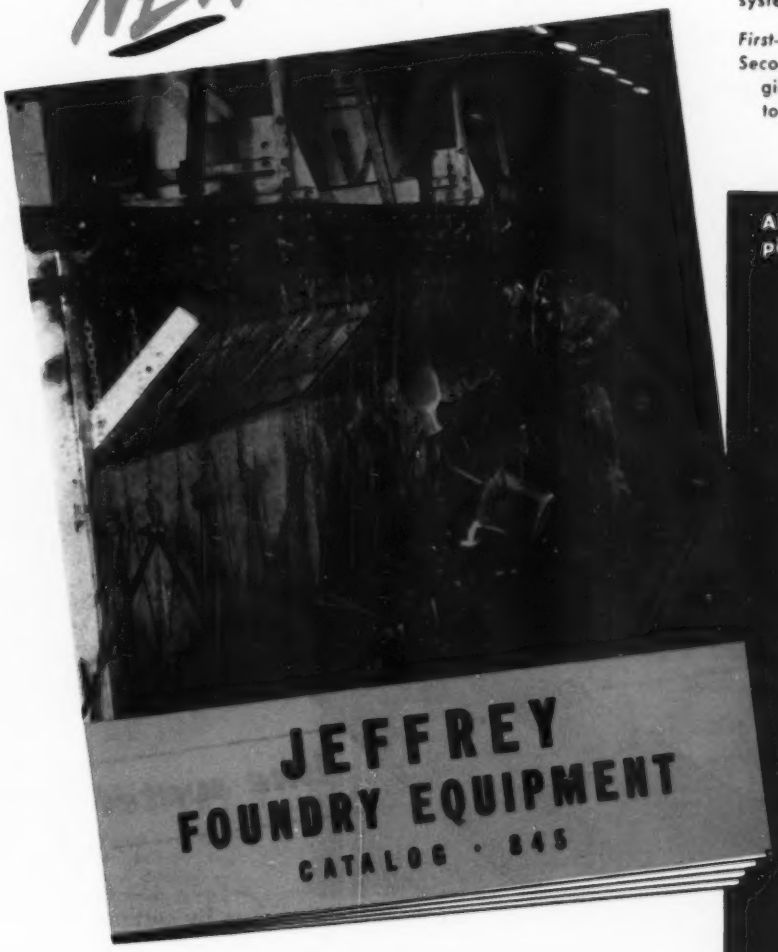
City _____ Zone ___ State _____

DOW CORNING DOW CORNING SILICONES **CORPORATION**
MIDLAND MICHIGAN

ATLANTA CHICAGO CLEVELAND DALLAS LOS ANGELES NEW YORK WASHINGTON, D. C. (Silver Spring, Md.)

In Canada: Fiberglas Canada Ltd., Toronto In Great Britain: Midland Silicones Ltd., London

Get this NEW CATALOG!



This 70-page book illustrates and tells how the various types of Jeffrey systems, equipment and machines can be applied to foundry operations, regardless of the size of the job—single unit or complete system.

First—Get a copy of Catalog No. 845.
Second—Consult with a Jeffrey foundry engineer for an accurate analysis and layout to suit your individual conditions.

All of these are described and pictured:

- Aerators
- Belt Idlers
- Bin Gates
- Brass Foundry Handling Systems
- Briquetting Systems
- Bucket Elevators
- Car Unloaders
- Car Spotters
- Castings Handling
- CLEANARATORS
- Coke Handling
- Continuous Pouring
- Conveyors (all kinds)
- Crushers
- Feeders
- Flask Fillers
- Hoppers
- Ladle Pushers
- Measuring Boxes
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- Paddle Mixers
- Pig Mold Conveyors
- Power Scoops
- Pulverizers
- SANDITIONERS
- Sand Preparation and Reclaiming
- Screens
- Valves for Molder's Hoppers
- Transmission Machinery

Also contains a list of some of the many Jeffrey-equipped Foundries

Send Coupon Today

The Jeffrey Mfg. Co.
907 North 4th St. Columbus 16, Ohio

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Company_____

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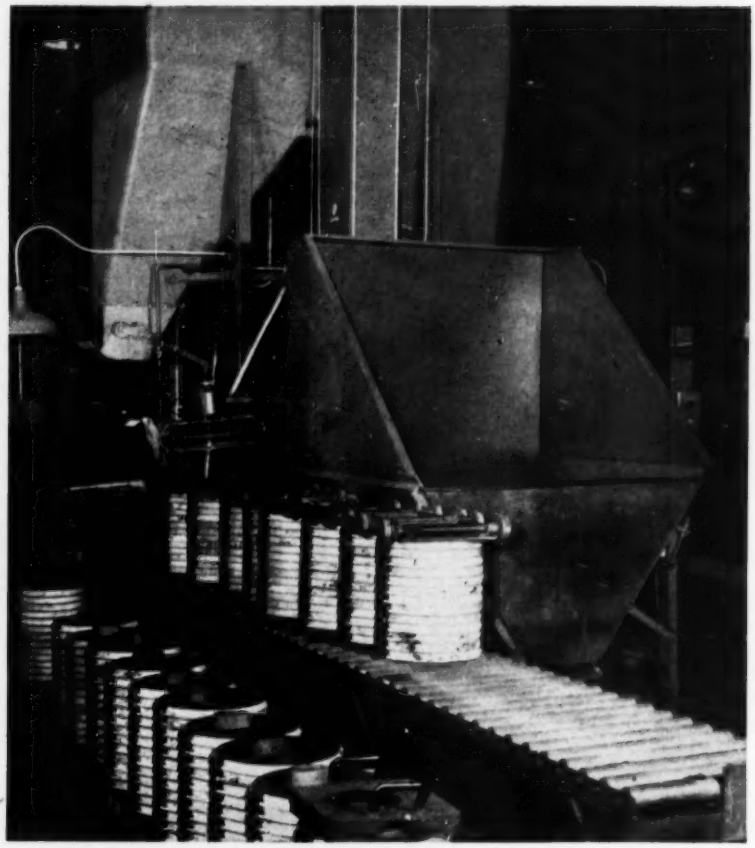
No more shoveling for Stanley...



...now that

SEALED POWER has a HANDY SANDY

Time spent shoveling by Stanley or any other molder adds to the cost of the molds without adding to their quality. By taking the shovels from their molders' hands and replacing them with the Handy Sandy, Sealed Power Corporation has increased their mold production. Sealed Power uses two twin-hopper Handy Sandys in molding their larger piston rings and thrust plates.

Use of the Handy Sandys diminishes molder fatigue and improves working conditions. It improves the quality of the sand due to the extra aeration given the sand as it enters the overhead hoppers.

Handy Sandy is a low-cost individual-floor sand handling system requiring no costly foundations. It gives you quick mechanization at a price you can afford to pay.

You can mechanize one floor at a time or your entire foundry as you choose. Newaygo will help you plan your mechanization so the savings you make will help pay the cost.

The catalog "Planned Mechanization for Foundries" tells how. Send for your copy today.

NEWAYGO | ENGINEERING COMPANY

NEWAYGO, MICHIGAN

Manufacturers of Neway® Mold Handling, Sand Handling and Conditioning Equipment

Measure by Weight Instead of Volume...

Two important variables to the success of good foundry molding are frequently overlooked . . . proper mixing and proportioning of mold, facing and core sand.

Large amounts of sand and small percentages of other materials make up the sand mix. Some additions are as low as one percent, to add certain physical properties to mold or core sands. Slight changes in proportioning can change the mold characteristics entirely. That's why measuring is so important.

Measuring is done many ways . . . by shovels, gallons, quarts, cubic feet, wheelbarrow . . . or by weight. Needed volumes may vary considerably, depending on the moisture of the sands.

With sand put into the muller, it's time to add other ingredients for a skillfully worked out mix. So Mr. Mixer measures out quarts or gallons of bentonite in a nice clean gallon measure, bumping it between dips in the sack to get, at last, a nice heaping measure . . . perhaps a gallon and a quarter. Multiply this error five or six times and see what it does to proportions. Surprising, too, how many pounds a gallon of bentonite, or any dry binder, will weigh when measured by different operators.

To properly add dry binders, use a scale. It's surprising how closely mixes follow a set pattern when everything is weighed accurately. Time consumed weighing is far less than measuring too, and far less costly, counting failures turned into successes.

Talk of the Industry

AN EARLY PEACE in Korea would have profound effect on all American industry, particularly heavy manufacturing and fabricating plants. Because of the recently revived truce talks at Panmunjom and the world-wide peace maneuvers of the newly installed Malenkov regime, the editors of AMERICAN FOUNDRYMAN have canvassed representative executives and officials in all branches of the foundry industry regarding the possible results of an early truce. See pages 82-84 of this issue for a comprehensive report to the industry.

MOLD DENSITY can influence solidification rate as much as a change in grade of molding sand according to a recent research report of the Institute of British Foundrymen. According to the study, higher density in a given sand mixture means faster solidification though this may not be true of all mixtures. Coarse sand appears to have chilling power equal to fine sand plus sea coal.

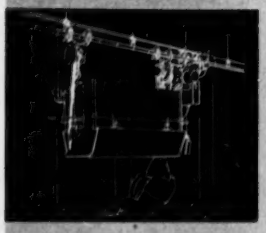
STOCKPILING CASTINGS has been recommended to the Secretary of Defense by Charles E. Moore, president, Moore Machinery Co., San Francisco. Pointing out that highly skilled foundrymen cannot be developed overnight to meet sudden high demands for critical castings in time of war, Moore suggests stockpiling rough-machined castings for machine tools. This, he says, would provide machine tool builders with seasoned castings ready for immediate use in time of emergency. Thus, instead of stockpiling expensive machine tools as called for in the Vance plan, relatively inexpensive castings would be stored, avoiding the danger of obsolescence and saving warehouse space, insurance, and protective lubrication.

COST OF BASIC INGREDIENTS of synthetic resins used in shell molding is well stabilized and there is little prospect that the small amount of resin used by the castings industry will have any influence in lowering the price, according to plastics people. With 80 per cent of the cost of a resin-sand mixture for shell molding tied up in the resin, best chance for cost reduction lies in learning how to use less resin.

NAMED SCHOLARSHIPS based on funds provided by individuals or companies will be actively promoted by the Foundry Educational Foundation. Aim is to supplement the present FEF scholarship program. Named scholarships would be administered by FEF and offered to foundry employees, sons of employees, or graduates of designated secondary schools qualified for admission to engineering, business administration, or industrial relations curricula. Selection of recipients would be made by local secondary school authorities and/or proper admissions officials in the chosen college or university.

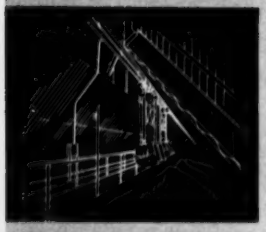
CUPOLA CHARGER developed in England uses weigh buckets hung from continuous chain conveyor, carries small weights of metallics and fuel instead of entire charge in single container. Tripping mechanism which causes certain buckets to discharge automatically as they pass a given cupola in line of melting units can be set by remote control from molding floor.

Dispatch to multiple stations

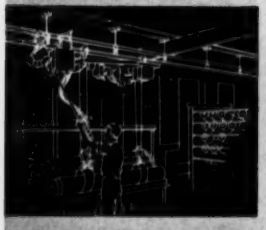


Delivery to fixed stations

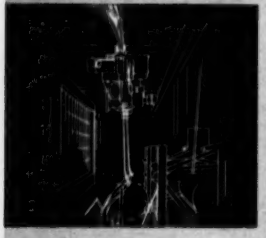
Delivery to multiple stations



Delivery to movable stations

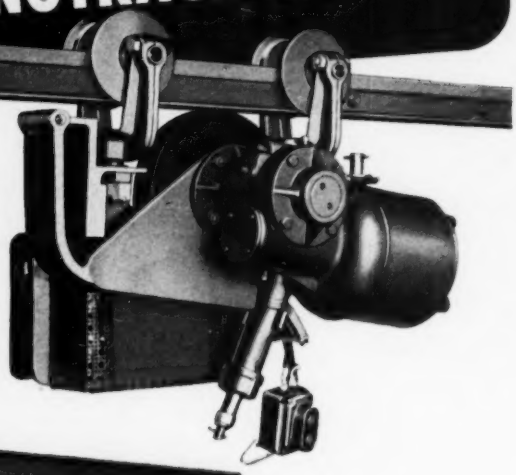


Selective dispatch between multiple stations

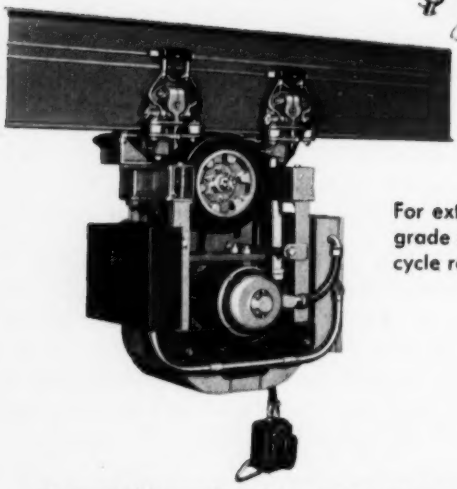


Load and delivery to multiple stations

2 New AMERICAN MONORAIL MONOTRACTORS



For low cost propulsion of a 1-ton hoist or carrier.



For extremely heavy-grade speed or duty-cycle requirements.

To propel heavy loads or automatic carriers on overhead monorail systems, here are two new American MonoRail MonoTractors. Through the application of simple electrical and mechanical devices, American MonoTractor Units perform a wide variety of automatic handling operations.

While unique in many features, such systems are built mainly from standard units. MonoTractors can be applied to carriers operating on any smooth bottom track. An American MonoRail Engineer is available for consultation in every important industrial area.

SEND FOR BULLETIN AD-1

THE AMERICAN MONORAIL COMPANY

13122 ATHENS AVENUE **CLEVELAND 7, OHIO**

MORE THAN 4500 FOUNDRIES ARE USING STERLING FLASKS

ONLY STERLING *Gives You* HEAVY-DUTY FLASKS *Engineered from* ROLLED STEEL CHANNEL

UP AND DOWN THRUST — Sections retain the same height. Will not collapse after continual usage. Heavy sand flanges with full-width bearing. Cannot curl under jolt action.

Almost a Half Century of "Know-How" Assures Precision-Built Steel Flasks Fabricated to Highest Quality Standards

You can always rely on Sterling Heavy Duty Flasks because they are carefully fabricated from hot rolled steel of 70,000 lbs. tensile strength and copper bearing. Backed by almost a half century of experience in this specialized field. All-steel welded construction . . . solid reinforcing bars . . . heavy rolled steel flanges . . . square corners . . . full-width bearing. These are Sterling patented, life-prolonging features that assure rigidity and accuracy, even under constant production pressure. Sterling Flasks are available in a variety of styles and shapes to meet your needs. Write for Catalog.

STERLING WHEELBARROW CO.
Milwaukee 14, Wisconsin, U. S. A.

A 5805-LPB-C

Here is the NEW

NEW foundry SAND for OLD with PNEUMATIC RECLAMATION

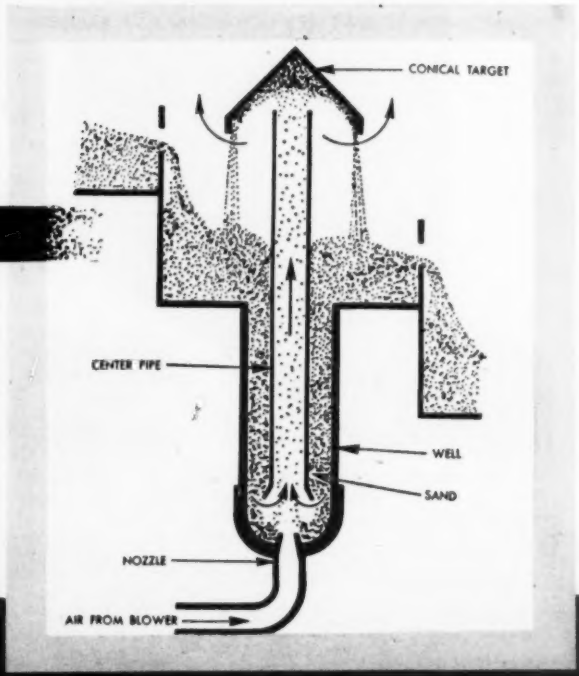
The need for Sand Reclamation

Most foundries have experimented with repeated reuse of their sand in an effort to overcome the expensive and wasteful necessity of disposing of used sand. All have found a point is quickly reached where a savings in sand cannot offset increased losses in production and cleaning operations. Sand grains soon become encased in shells of old bond. These "pickle" grains decrease flowability until the sand is no longer within a workable range.

Many reclaiming methods have been proposed and tried but few have been successful. The NATIONAL Sand Recovery System is the first *truly* practical method for affording controlled, economically sound reclamation of foundry sands.

HERE'S HOW IT WORKS...

The NATIONAL Recovery Unit is comprised of a variable number of scrubbing cells. A turbine type blower supplies a high velocity air stream to hurl the air/sand mass upward through a vertical center pipe. Colliding with other grains within the peak of the conical skirted deflector individual sand grains themselves act as the abrasive body. The grains fall back to the main sand mass while the motivating air escapes upward carrying fines and air floatable particles of "shell" out the exhaust. Control of reclamation is maintained by adjusting the feed rate . . . elimination of fines is controlled by the exhaust velocity.



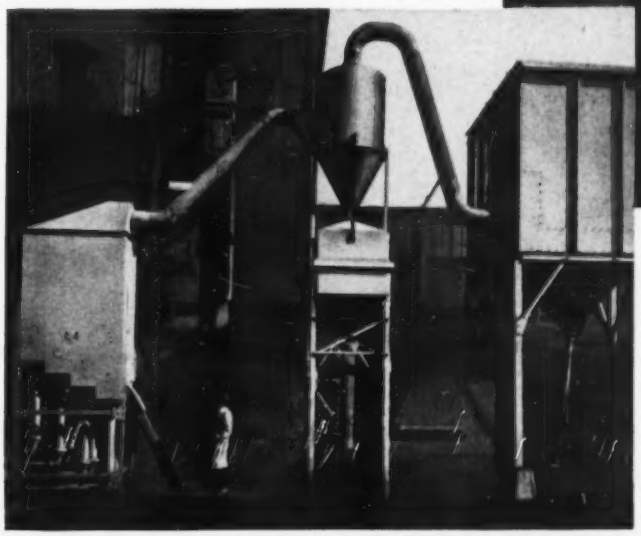
NATIONAL SAND RECOVERY SYSTEM

NEW PROFITS from your SAND DUMP

Used or "burnt out" sand—long idle . . . never before usable and certainly a major handling and storage expense, can become a new sand supply source through use of the NATIONAL System.

A typical sand reclaiming system would consist of a Vibrating Conveyor and Screen, Surge Bin, Vibrating Feeder and NATIONAL Sand Scrubber. Limited space requirements . . . complete operational and construction simplicity . . . little or *no* additional man power demand—all combine with low initial cost and immeasurable return on investment to make the NATIONAL Recovery System well worth *your* consideration.

Foundry tested and proved, reports on the NATIONAL Sand Recovery System have indicated no limitation on the type, usage or grades of sand that can be pneumatically reclaimed. One customer reports that a single NATIONAL Unit is *saving* them better than $700.00 per *day.*



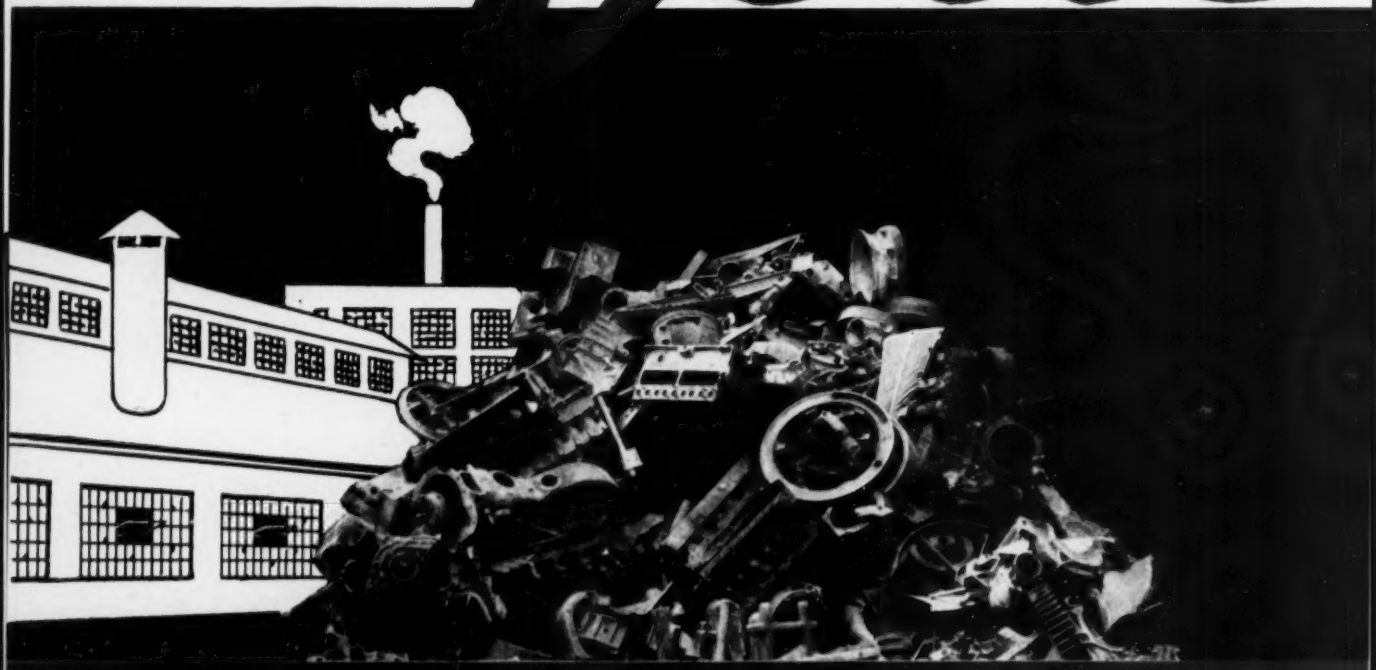
The view above, right, is of an interior installation of a National Sand Scrubber showing the Sand Elevator at left and Sand Scrubber discharge chute at lower center. At the right is a typical exterior installation showing National Sand Scrubber, fines collector and dust collector.

Write for Bulletin 512 for the complete story on the new NATIONAL Sand Recovery System.

SIMPSON *Intensive* **MIX-MULLERS**

Product of a Practical Foundryman

WHY LET CASTING *Pile*



It's as easy as this to safeguard your casting quality and reduce rejects to the minimum when you use

Famous
CORNELL CUPOLA FLUX

SCRAP LOSSES *up?*

- **CASTING REJECTS ARE A SERIOUS LIABILITY— THEY INTERFERE WITH PROFIT AND DELIVERIES**

The amount of casting scrap at leading gray iron foundries and malleable foundries with cupolas, is amazingly small — practically nil, due to the constant use of —

Famous CORNELL CUPOLA FLUX

THE IRON CLEANSER with a background of more than 35 years' success in making metal better for better castings and ensuring the highest efficiency in cupola operation.

Why not profit by this outstanding achievement in molten iron purification? Your iron will be hotter and more fluid, and sulphur greatly reduced — your castings will be definitely sounder and cleaner, and machining easier.

Made in pre-measured SCORED BRICK FORM, it is ready to use without digging out of container, weighing and measuring. It takes but a few seconds to toss it into cupola with each ton charge of iron, or break off one to three briquettes (quarter sections) for smaller charges, as per instructions.

THE CUPOLA before using Famous Cornell Cupola Flux

THE CUPOLA where Famous Cornell Cupola Flux is used.

KEEPS CUPOLAS CLEANER. Down time and maintenance cost are greatly reduced as drops are cleaner and bridging over is practically eliminated. And a glazed or vitrified protective surface is formed on cupola lining, reducing erosion and repairs.

WRITE FOR BULLETIN NO. 46-B

The Cleveland Flux Co.

1026-1040 MAIN AVENUE, N. W., CLEVELAND 13, OHIO

Manufacturers of Iron, Semi-Steel, Malleable, Brass, Bronze, Aluminum and Ladle Fluxes – Since 1918

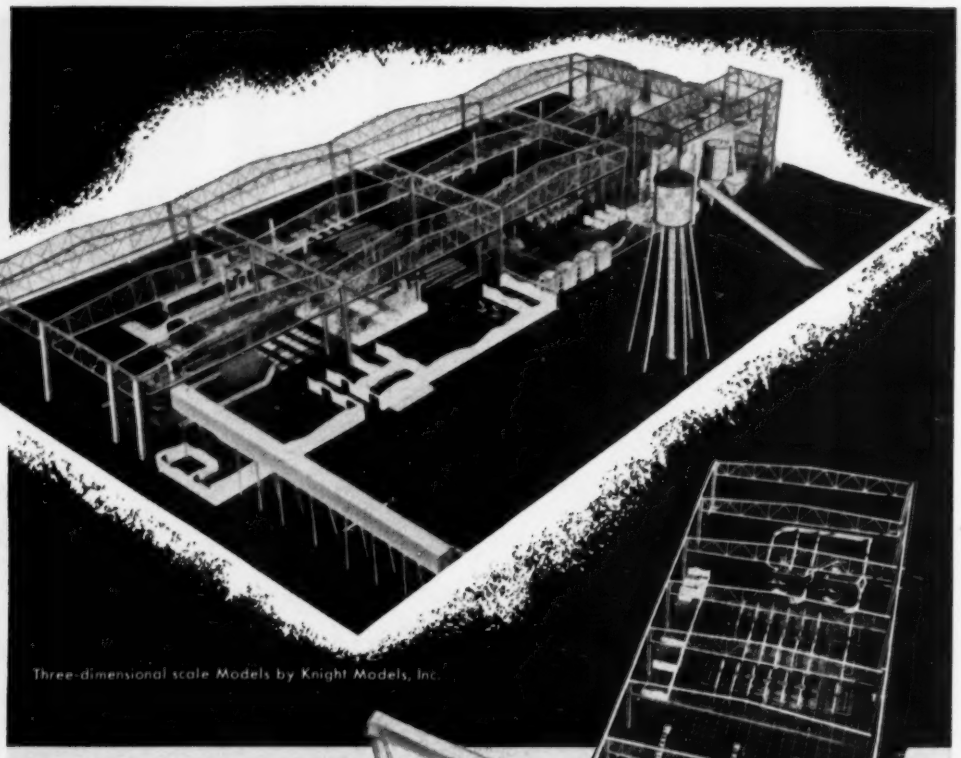
FAMOUS CORNELL FLUXES
Trade Mark Registered

BRASS FLUX

FAMOUS CORNELL BRASS FLUX cleanses molten brass even when the dirtiest brass turnings or sweepings are used. You pour clean, strong castings which withstand high pressure tests and take a beautiful finish. The use of this flux saves considerable tin and other metals, and keeps crucible and furnace linings cleaner, adds to lining life and reduces maintenance.

ALUMINUM FLUX

FAMOUS CORNELL ALUMINUM FLUX cleanses molten aluminum so that you pour clean, tough castings. No spongy or porous spots even when more scrap is used. Thinner yet stronger sections can be poured. Castings take a higher polish. Exclusive formula reduces obnoxious gases, improves working conditions. Dross contains no metal after this flux is used.



Three-dimensional scale Models by Knight Models, Inc.

A partial list of Knight clients

Appleton Electric Company
South Milwaukee, Wis.
Canadian Car and Foundry Company, Ltd.
Montreal, Quebec
Chrysler Corp.
New Orleans, La.
Crane Company
Chicago, Ill.
Dalton Foundries, Inc.
Warsaw, Indiana
Electric Steel Foundry Company
Portland, Ore.
Erie Malleable Iron Company
Erie, Pa.
Fahralloy Limited
Orillia, Ont.
Fairbanks, Morse & Company
Kansas City, Kan.
Hammond Brass Works
Hammond, Ind.
Haynes Stellite Company
Kokomo, Ind.
Macfarlane
Sagua la Grande, Cuba
Moline Malleable Iron Company
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National Roll & Steel Foundry
Avonmore, Pa.
Pittsburgh Steel Foundry Corporation
Glassport, Pa.
Pyle-National Company
Chicago, Ill.
Sulzer Bros. Ltd.
Winterthur, Switzerland
Unitcast Corporation, Ltd.
Sherbrooke, Quebec
Universal Castings Corporation
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Wagner Malleable Iron Company
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Woodruff & Edwards, Inc.
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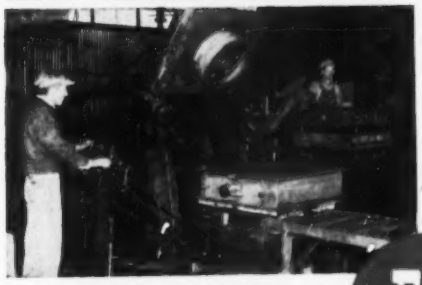

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These BS&B Foundry Flasks at Kansas City Hay Press show how BS&B is able to meet special customer requirements with standard units . . . often at a big savings in time and money. In this case, BS&B used standard FP17 Flasks, ¼" thick, and added a special outside sand strip to allow conveyor handling without handles! Let a BS&B salesman tell you more about one way BS&B Foundry Flasks may lower operating and maintenance costs for you.

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Like other successful foundries, Kansas City Hay Press knows that the secret of a profitable operation is to keep operating and maintenance expenses low. They learned, long ago, that BS&B Foundry Flasks practically *guarantee* good castings . . . and the Kansas City flood *proved* the way BS&B Foundry Flasks can take it! E. C. Sooy, who operates the foundry, will tell you that there was no pitting, corrosion or damage caused to the flasks by flooding, even though they were under water for several days!

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FOUNDRY — BS&B — FLASKS

Foundry men in the News

Tom R. Smith, director of research and development for Maytag Co., Newton, Iowa since 1938, has been named vice president in charge of research and development. Mr. Smith started to work for the organization following his graduation from high school. After working in the machine shops a year and then a year at the University of Iowa, he entered the Massachusetts Institute of Technology, where he was graduated in 1932 with a B.S. in engineering. Under Mr. Smith's direction, new addition is being completed at Newton adjoining the research and development building, which will double the capacity of that division of the company.

William Rodgers

Blaw-Knox Co., Pittsburgh, has named **William Rodgers** to the new staff post of general sales manager. Mr. Rogers will coordinate sales activities for all divisions, and assist in developing sales objectives, policies, and programs.

Walter A. Stuhr has joined May-Fran Engineering Inc., Cleveland, as regional sales engineer of the mid-western office recently opened at 53 West Jackson, Chicago, where he will represent the company's line conveyors, scrap handling systems, etc.

Elden L. Auker, formerly Detroit district manager, Bay State Abrasive Products Co., Westboro, Mass., has been named sales manager for the company, succeeding **E. Halsey Brister,** who has been made director of product development and quality control. **S. Gordon Saunders** has been appointed Detroit district manager in Mr. Auker's former territory.

Karl S. Howard has been named assistant vice president, Foundry div., Canadian Car & Foundry Co., Ltd., Montreal. Mr. Howard was recently consultant to the Ordnance Tank-Automotive Centre Detroit, and the Philadelphia Ordnance District Office. He was formerly associated with General Steel Castings Corp., Granite City, Ill.

Ted Operhall was recently appointed vice president-general manager, Misco Precision Casting Co., Detroit Div. **Charles W. Schwartz** has been named production manager of Misco's Whitehall div., Whitehall, Mich., and **Charles Yaker** has become production manager of the company's Detroit division.

Burton R. Buck

Burton R. Buck has been appointed works manager of Electro Metallurgical Co., a division of Union Carbide & Carbon Corp., New York. Mr. Buck, who joined Electromet in 1934, has been assistant works manager since 1951, and has been located in the general offices in New York. Prior to that, he was in charge of production operations at three of the company's ferro-alloy plants.

Eads Johnson, Jr., formerly executive vice-president of the Southern Wheel Div., American Brake Shoe Co., New York, has been named president of the division. He succeeds **William F. Cutler,** son of one of the founders, who is retiring after 44 years' service. Mr. Johnson, joined Brake Shoe in 1934 as an apprentice in the castings division. He became a sales representative in 1935, continuing in this position until his appointment as assistant vice-president of the wheel division in 1949.

Donald L. Mason

Donald L. Mason recently resigned from Stanford University after ten years' service and accepted the position of plant engineer with Superior Electrocast Foundry Co., South San Francisco. He will be responsible for improvement of plant operations, including equipment facilities, foundry technique and new developments. Mr. Mason, who graduated from Oregon State College in 1937 with a B.S., taught in Oregon State's college foundry until 1942. He then accepted the position of assistant professor of mechanical engineering at Stanford University. He had complete charge of foundry operations, including pattern making and foundry practice, as well as forging, welding, heat treating and industrial processes in the Mechanical Engineering Department. To keep up-to-date on new developments, he worked in commercial foundries.

Roger F. Waindle, Cannon-Muskegon Corp., Muskegon, Mich., was elected president of the American Society of Tool Engineers at the society's 21st annual meeting in March. He succeeds **L. B. Bellamy.** Also elected to direct affairs of the society are: first vice president, **Joseph P. Crosby,** LaPointe Machine Tool Co., Hudson, Mass.; second vice-president, **Harry B. Osborn, Jr.,** Tocco Div., Ohio Crankshaft Co., Cleveland; third vice-president, **Howard C. McMillen,** Philco Corp., Bedford, Ind.; secretary, **Raymond C. W. Peterson,** Peterson Engineering Co., Toledo; Treasurer, **Harold E. Collins,** Process Engineering Dept., Hughes Tool Co., Houston; assistant secretary-treasurer, **Wayne Ewing,** Arrowsmith Tool & Die Co., Los Angeles.

William L. Manly, for several years special assistant to the vice president-director of sales, General Machinery Div., Allis-Chalmers Mfg. Co., Milwaukee, has been named assistant director of the division's sales.

continued on page 38

Foundrymen in the News

continued from page 37

J. Doyle Robbins

James W. Stuart

Osborn Manufacturing Co., Cleveland, has promoted three men in the machine division. **George E. Miller,** who has been assistant sales manager of the division since 1943, assumes responsibilities of sales manager. Mr. Miller is chairman of the Foundry Education Advisory Committee for Case Institute of Technology. **James W. Stuart,** who has been sales engineer in the eastern territory for the past two years, has been appointed assistant sales manager at the Cleveland office. **J. Doyle Robbins,** who has been production manager of the division, becomes assistant to the vice president.

George E. Miller

Alvin O. Eidson, metal Patternmaker apprentice, Stockham Valves & Fittings, Inc., Birmingham, Ala., was honored recently by the presentation of a certificate of national recognition from the National Association of Manufacturers. The certificate reads in part: "The National Association of Manufacturers presents this certificate in recognition of the importance of apprentice training, in the preparation and development of the skilled craftsmen of American industry, essential to its productive effectiveness, the development of its managerial team, and an ever-expanding national economy." Competition for the honor was statewide. The record of each Stockham apprentice was reviewed, and Mr. Eidson's was selected as the most outstanding. He was then judged outstanding apprentice by the Apprentice Selection Committee of the State of Alabama. This group in turn recommended him for the national award.

M. P. Drummond has been appointed manager of coke sales, and **F. P. Jasper** manager of chemical sales for Colorado Fuel & Iron Corp., New York. Sales offices for coke and chemical sales are now situated in the C. A. Johnson Bldg., Denver.

John A. Hipple, Chief of the atomic section, National Bureau of Standards, Washington, D. C., has been named director of the Mineral Industries Experiment Station, Pennsylvania State College, Pa.

Paul L. McCullough, Jr. has been appointed sales manager of Electro-Alloys Div., American Brake Shoe Co. Mr. McCullough joined the company as a trainee in 1945. He became sales engineer in 1947 for the American Manganese Steel Div. and the Electro-Alloys Div. In 1951 he was appointed district sales manager for Amsco Div., Pittsburgh.

Richard Wilson, American Hoist & Derrick Co., Minneapolis, was recently promoted assistant foundry superintendent. Mr. Wilson joined American Hoist as senior laboratory assistant in 1941. After serving four years with the Marine Corps, he returned to the company for a year, then entered the University of Minnesota where he earned his B.Met.E. and M.S. In 1949 he joined Armour Research Foundation, and American Hoist the following year.

Tennessee Products & Chemical Corp., Nashville, Tenn., has named **Eugene F. Allen** manager of market development and research. Other appointments include: Harrison S. Weeks, manager of Tennessee's Chicago sales office; **Steve Williams,** technical engineer, Building Products Div.; **O. Lewis Staerker,** in charge of sales of agricultural chemicals.

Dodge Steel Co., Philadelphia, has named **Edward H. Berry** foundry manager and chief metallurgist, and **Henry J. Kelly** chief engineer.

Basic Refractories Inc., Cleveland, has announced the election of two vice presidents. **Max M. Muller** will direct operations and engineering and **Harvey N. Barrett, Jr.,** will take charge of sales activities. Dr. Muller holds a master's degree in mechanical engineering from the Swiss Federal School of Polytechnics and a Ph. D. in Ceramic Engineering from Ohio State University. While at Ohio State he joined Basic Refractories as a laboratory assistant to H. C. Lee. In 1946 he returned to Switzerland as general manager of Swiss Grinding Wheel, Ltd. He rejoined Basic Refractories in 1949 as Ohio works manager. Mr. Barrett also joined the company while a student at Ohio State. Upon receiving an A.B. in mineralogy, he began in production at the company's Ohio Works in Maple Grove. After army service, he served successively as manager of refractory sales development, assistant to the vice president of sales, assistant to the president and most recently as manager of refractory sales.

Bradford Colcord, who was recently re-elected president of Woodward Iron Co., Birmingham, Ala., has resigned. Ill health is given as the reason for leaving the post he has held since 1948. Mr. Colcord went to Birmingham in 1933, when he was associated with Sloss-Sheffield Steel & Iron Co. He joined Woodward Iron in 1935, and resigned the next year to become assistant general superintendent of National Tube Co., McKeesport, Pa. He resigned from National Tube at Lorain, Ohio, in 1948 to become president of Woodward Iron. Since 1948 the company has mechanized its Mulga mine and completed a new blast furnace.

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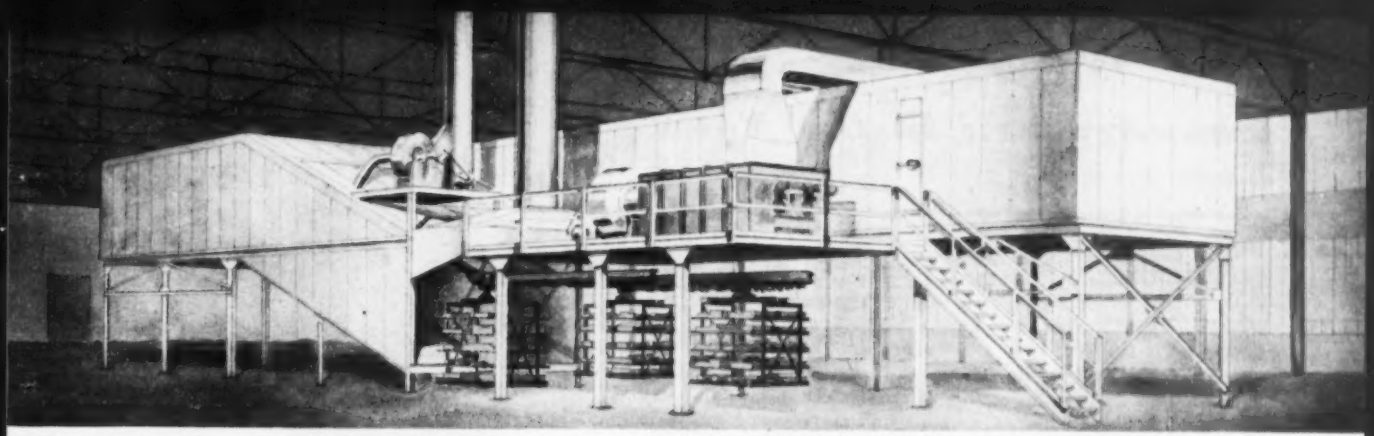

CARL-MAYER HORIZONTAL MONORAIL CORE OVEN at Eclipse Aviation Co.
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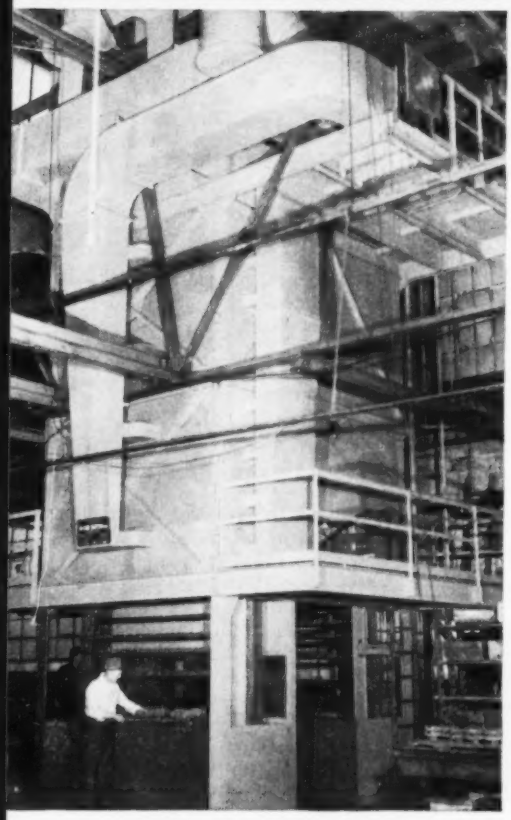

CARL-MAYER VERTICAL CORE OVEN
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American Brake Shoe Co.
American Radiator Co.
Blaw-Knox Co.
Brown Industries
Buick Motor Div. of General Motors Corp.
Bucyrus-Erie Co.
Cadillac Motor Div. of General Motors Corp.
Columbia Steel Corp. (U. S. Steel Corp.)
Crucible Steel Castings Co.
Dunkirk Radiator Co.
Eclipse Aviation Division of Bendix Aviation Corp
Electric Autolite Co.
Ford Motor Co.
Fremont Foundry Co.
G. & C. Foundry Co.
General Electric Co.
General Motors Corp. and Subsidiaries
Gilbert & Barker Co.
General Steel Castings Co.
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W. O. Larson Foundry Co.
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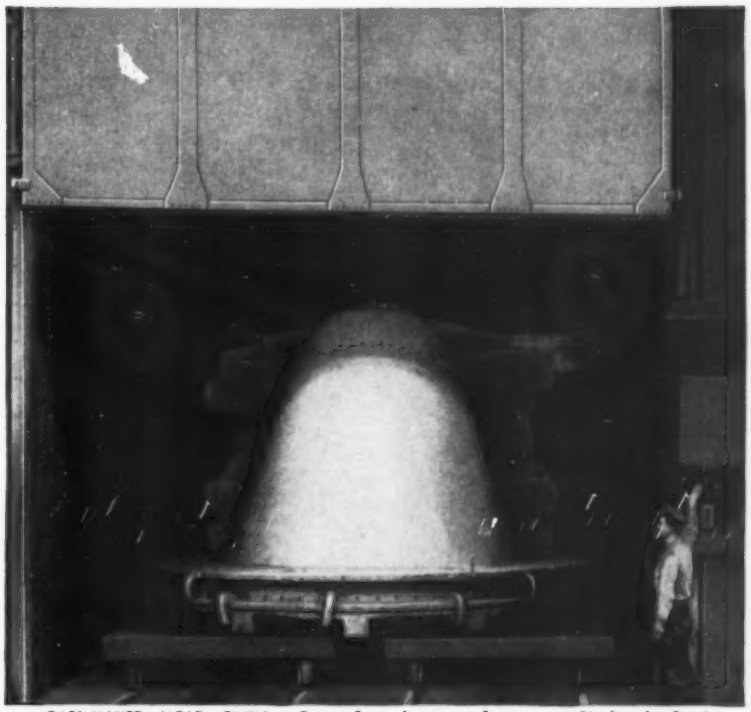
F. E. Meyers & Bro. Co.
Oil Well Supply Co. (U. S. Steel Corp.)
Packard Motor Car Co.
Pittsburgh Steel Foundry Corp.
H. B. Salter Co.
Shenango Penn Mold Co.
Standard Foundry Co.
Union Brass & Metal Mfg. Co.
Union Steel Castings Co.
West Michigan Steel Castings Co.
A. C. Williams Co.
Whiten Machine Works
Whiting Corp.



CARL-MAYER MOLD OVEN. One of a battery of two at Pittsburgh Steel Foundry Corp. Capacity: 100 tons per charge (each oven). PATENT APPLIED FOR.

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Backed by reputation and over 30 years' experience

Foundrymen in the News

continued from page 38

The Council of the Institute of Metals awarded its 1952 W.H.A. Robertson Medal and Fifty Guinea Premium to **John Francis Waight,** West Midlands Gas Board, England, for his paper on *"Gas Equipment for the Thermal Treatment of Non-Ferrous Metals and Alloys,"* published in the *Journal of the Institute of Metals.* The medal and premium are awarded annually for the encouragement of papers on engineering aspects of non-ferrous metallurgy. Two awards of ten guineas each for essays submitted in connection with the annual Students' Essay Prize Competition were given to: **R. D. Stacey,** University of Birmingham for *"Some Experimental Evidence for Dislocations,"* and to **G. Thomas,** B. Sc., Cambridge, for *"Martensitic Transformation in Non-ferrous Metals and Alloys."*

James J. Reynolds, a member of the National Labor Relations Board from 1946 through 1951, has been appointed vice-president in charge of industrial relations for American Locomotive Co., Schenectady, N. Y.

Edward A. Macke, Jr. has joined the S. H. Bell Co., Pittsburgh, and is selling metallurgical products produced by Tennessee Products & Chemical Corp. He was formerly maintenance metallurgist, Pittsburgh Works, Jones & Laughlin Steel Corp.

Harold H. Miller recently was named to the position of foundry superintendent of the Buick Motor Div., GMC, Flint, Mich., succeeding **E. H. Bankard,** resigned. Mr. Bankard has been with the company 22 years. **Harold T. McGrath,** has been named assistant chief metallurgist, the position Mr. Miller held.

Fred B. Shew, formerly district manager of the Chicago office, Wellman Engineering Co., has been named sales manager of the bucket department, with headquarters in the Cleveland home office where he will supervise distribution of the company's clamshell and dragline buckets, log and stone grabs. Mr. Shew previously was New York office district manager.

Ohio Ferro-Alloys Corp., Canton, Ohio, has appointed **Don McLeod** western representative, with offices in Los Angeles.

Elmer E. Braunn, formerly assistant manufacturing manager, has been named manufacturing manager, Central Foundry Div., GMC, with headquarters in Saginaw, Mich., succeeding **S. W. Healy** who has resigned. Mr. Braunn joined Central Foundry's Saginaw plant in 1929 as a cooperative student of GMC Institute.

Cyril S. Taylor, chief of the Physical Chemistry Div., Aluminum Research Laboratories, New Kensington, Pa., has retired following 32 years' service with Alcoa. **Dr. Allen S. Russell** has succeeded Mr. Taylor. **Dr. L. M. Foster** has been named assistant chief. **Dr. Robert C. Plumb** and **R. C. Geiger** have been transferred to the division.

J. E. Waugh has been named manager of foundry operations, General Electric Co., Schenectady, N. Y. Named to the same position in Erie, Pa., is **L. A. Dunn,** and in Elmira, N. Y., **R. H. Roberts** will manage foundry operations. **Joseph B. Stazinski** was recently named manager of the Everett and Lynn, Mass. Foundries.

E. P. Roudebush, works manager, Roots-Connersville Blower Div., Dresser Industries Inc., Dallas, Tex., has been named vice president and works manager in charge of manufacturing activities at the Connerville, Ind., and Delaware, Ohio, plants. **D. A. Johann** has been made vice president of sales activities in Connersville and for division branch offices and dealers.

Mario Olivo, Impianti Fonderie Olivo, Milan president, National Association of Foundry Machinery and Equipment Suppliers, Milan, Italy, was recently honored by the Italian Republic by presentation of the Order of Merit. Mr. Olivo, has been a member of the International Committee of Foundry Technical Associations, and is chairman of its Dictionary of Foundry Terms Committee.

J. A. McCabe has been appointed general production manager, Aircraft Engine Div., Ford Motor Co., Chicago. He has been with Ford's Tank Division in Livonia, Mich.

Edward H. Platz Jr. has returned to Lebanon Steel Foundry, Lebanon, Pa., as manager of alloy sales, following leave of absence to serve as nickel specialist, Iron and Steel Division, National Production Authority.

James V. Burrell

Electric Furnace Co., Salem, Ohio, has appointed **James V. Burrell** Michigan District sales representative. Mr. Burrell has been connected with the company over 15 years in various departments. He will handle their complete line of fuel-fired and electric furnaces, special atmosphere generators and mechanized material handling equipment.

William Hagel, vice president-sales, and **Maurice P. Sieger,** vice president-senior engineer, United Engineering & Foundry Co., Pittsburgh, have been named company directors.

Oscar F. Stewart has been appointed executive staff assistant, Commercial Contracting Corp., Detroit, where he will supervise systems and procedures in all offices of the company. Mr. Stewart recently resigned as associate director of case analysis, Wage Stabilization Board.

Lyle L. Clark, formerly assistant superintendent of melting, Buick Motor Div., General Motors Corp., Flint, Mich., has become supervisor of MM foundry research at Armour Research Foundation, Chicago. He was with Buick in various metallurgical capacities for 18½ years, five years as foundry metallurgist. Another Armour appointment brought **Jack W. Giddens** to the organization as chief research metallurgist in the foundry. He has previously been with Perfect Circle Co., Sleeve Castings Plant, Richmond, Ind., as chief metallurgist and was foundry metallurgist with International Harvester Co., Indianapolis, Ind.

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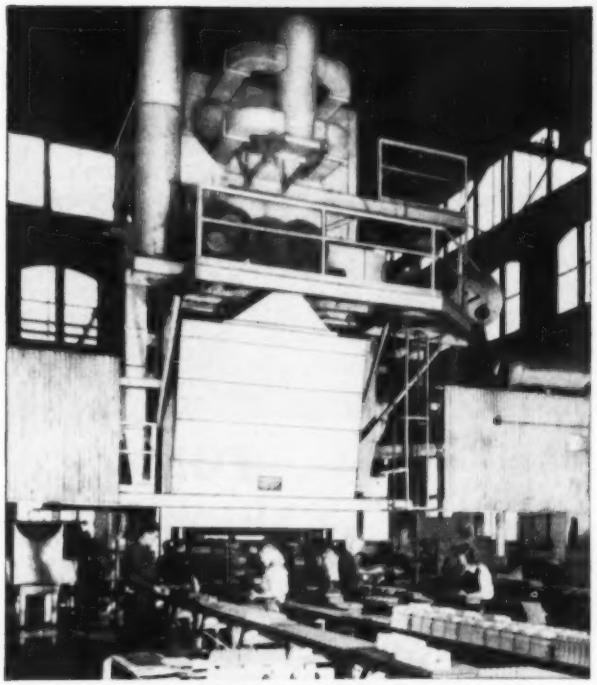

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at Eastern Malleable Iron Company

The proper selection of core and mold ovens is vital to profitable casting operation. That's why it's important that you get all the facts about Coleman Ovens and see the performance records that prove their ability to provide substantial savings.

Over 80% of Coleman Ovens are "repeat orders" from customers... conclusive evidence of continuous, dependable performance in foundries of all types. You get over 50 years of know-how and experience in every Coleman Oven, so why gamble with inferior types?

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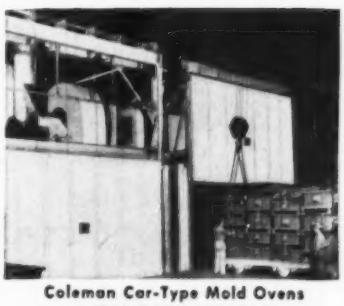
Coleman Transrack Ovens
at Crucible Steel Castings Co.



Coleman Car-Type Mold Ovens
at Clark Brothers Company

Coleman Car-Type Core Ovens
at Cooper-Bessemer Corporation

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Editorial

Are We Fiddling While Rome Burns?

■ Late in March, A.F.S. and the great University of Wisconsin jointly sponsored in Madison, the capitol city of the state, a carefully prepared seminar on foundry safety, hygiene, and air pollution. All who attended agreed that the arrangements were superior, the papers excellent, the program decidedly worth-while.

That seminar was attended by *exactly 25 foundry representatives!* On the same day and almost across the street from the university campus where the seminar was in progress, the state legislators were carrying on an investigation of the foundry industry's safety and health practices. The foundrymen weren't there either!

In all honesty, it can be said that the seminar, from an attendance standpoint, was a "flop." So, too, was the seminar at the University of Illinois the previous month. We suspect, however, that the indifference of foundry management to these important meetings exposes the very reason for the tremendous increase in legislative efforts to control, to regulate, and to enforce upon the industry something that the industry itself can cure if it wishes.

The A.F.S. group that sponsored these meetings is the Safety & Hygiene & Air Pollution Program. Safety as an activity has never aroused much enthusiasm among foundrymen. It has been termed a "fringe" activity—among the first to be curtailed or dropped when sales fall off.

Industrial Hygiene, to many production-centered plant managers, seems to be a rather nasty word—smacking of smelly laboratories, test tubes, guinea pigs, and medical high-brows. Pre-employment chest and heart examinations? Periodic lung x-rays? Occupational disease hazards? "Listen, brother, this is a foundry, not a hospital clinic!"

And so we come to Air Pollution. Year by year, steadily and surely, city after city has adopted local smoke ordinances, hired and trained plant inspectors, and put real teeth into their air pollution regulations. Year after year, labor and government seeks (and finds) new ways to control working conditions and to make political hay from the fertile fields of careless or indifferent plant operations. How long can we fiddle before it's time to call the fire department?

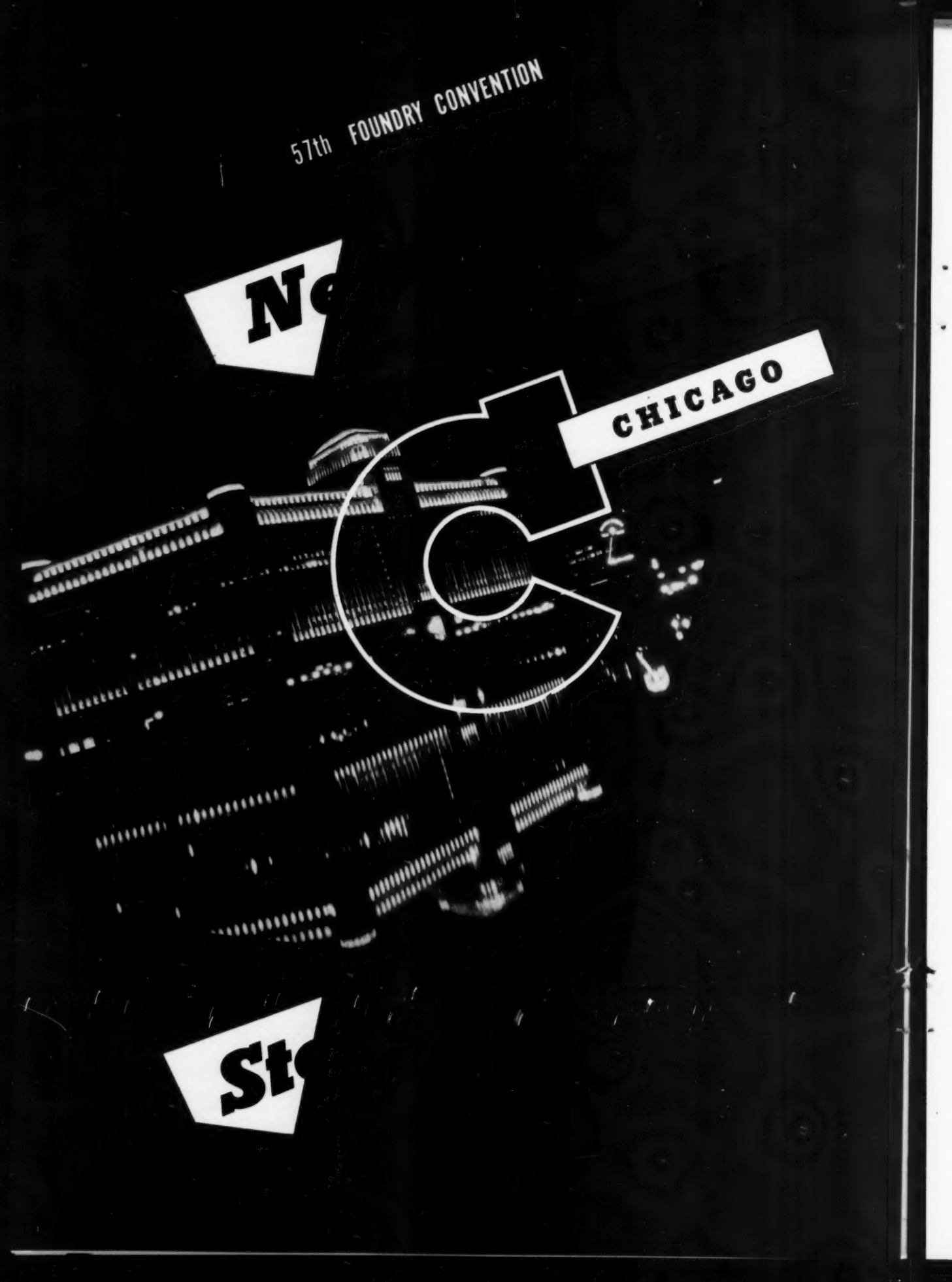
No one would say that the castings industry is incapable of correcting, by its own efforts, those conditions which caused A.F.S. to undertake an industry-wide program for the betterment of safety, hygiene, and air-pollution practices. Even though the industry to date has contributed only $75,000 of the $350,000 needed for the ten-year program, the committees are doing their best to develop needed data.

It would help a lot right now to have a few less fiddlers and more volunteer firemen in all phases of the program before this long-smoldering blaze gets away from us.

Wm. W. Maloney

Secretary A.F.S.

57th FOUNDRY CONVENTION



Annual A.F.S. Convention and Foundry Congress

Marking the first session in Chicago since 1940, the 57th Annual Convention and Foundry Congress of the American Foundrymen's Society was held in the midwestern metropolis during the week of May 4-8.

Several thousand foundrymen from all sections of the United States, Canada, Mexico, and other countries attended, many with their ladies. Every phase of the metallurgical field was represented—executives, research engineers, educators, plant supervisory and operating personnel, sales executives, and government and military officers.

The Convention business meetings and technical sessions were held at the Hotel Sherman, with the annual dinner at the Morrison's Terrace Casino. The visiting foundrymen were given a choice of over 60 technical sessions, including 118 papers and 5 panel discussions. Shop courses were presented by three divisions, with eight sessions scheduled. The program included 23 committee meetings and 4 events held by other foundry societies and organizations.

Business Meeting

National President I. R. Wagner presided at the Annual Business Meeting of the Society, held on Thursday, May 7, in the Sherman's Grand Ballroom. President Wagner delivered the annual President's Message and also introduced the new national officers and directors of A.F.S. Another feature of this meeting was the presentation of prizes to first place winners in the national Apprentice Contest.

The Business Meeting was followed by the Charles Edgar Hoyt Annual Lecture, delivered by James H. Smith, General Manager, Central Foundry Div., General Motors Corp. The subject, "*Outstanding Opportunities for the Foundry Industry*," was very timely and presented an incisive survey of the future of the industry.

The foundry industry, Mr. Smith said, is presented with prospects for significant progress in five important fields: molding methods and materials, metallurgy of cast iron, heat treatment of cast iron, methods engineering, and educational programs. Shell molding, he emphasized, is "one of the greatest technical developments of our time in the Foundry Industry." This process holds out the promise of complete mechanization of the molding operation, with its widespread use depending upon reductions in the cost of phenolic resins.

Mr. Smith predicted increased activity in pressure molding, nodular iron, low-sulphur iron, and pearlitic malleable. In research he saw the opportunity for the most rapid technological advancement. "The use of micro-chemistry," he remarked, "is in its infancy in the foundry industry."

After discussing various methods of heat treatment to achieve improved machinability and general characteristics, Smith concluded his speech with a review of the increasing trend toward methods engineering and the training and education of employees.

Annual Banquet

The Terrace Casino of the Hotel Morrison was filled to capacity for the 35th Annual Dinner of A.F.S., on the evening of May 6. In his address, President Wagner reviewed the progress of American Foundrymen's Society during the past year. He stressed the trend away from the highly theoretical, toward practical application of engineering fundamentals, as expressed in the activities of all A.F.S. Committees. He called attention to the fact that the foundry industry is just beginning to realize the benefits derived from educating college men to the advantages of the foundry as a profession.

Gold Medals and Honorary Life Memberships were awarded for distinguished service to the Society and the industry.

The William H. McFadden Gold Medal was awarded to William J. Grede, president, Grede Foundries, Inc., and 1952 president of the National Association of Manufacturers. Mr. Grede was cited for "outstanding public service bringing great credit upon and broad recognition for the entire Foundry Industry."

The John H. Whiting Gold Medal was presented to Daniel E. Krause, Executive Director, Gray Iron Research Institute "for outstanding contributions to the Society and the Foundry Industry in the field of ferrous metallurgy and research."

William Romanoff, H. Kramer & Co., received the Joseph S. Seaman Gold Medal. The award was presented "for exceptional contributions to the Society and its Brass and Bronze Division over many years."

The Peter L. Simpson Gold Metal went to James

General view of banquet speakers tables on the stage at the Terrace Casino. Backdrop was colorful foundry painting. Tables were set on tiers rising to rear of the room.

With lights dimmed, dessert at the annual Banquet was served to the accompaniment of flaming brandy poured from a ladle. Effect was spectacular and fitting for the occasion.

H. Smith, General Manager, Central Foundry Division, General Motors Corp., who was also the Hoyt Lecturer. Mr. Smith was saluted for "outstanding contributions to the application of engineering principles in foundry practice, and as the 1953 Charles Edgar Hoyt Annual Lecturer."

Honorary Life Memberships were awarded to George J. Barker University of Wisconsin, and to I. Richards Wagner, retiring President of American Foundrymen's Society. Prof. Barker was recognized for his contributions in education, Mr. Wagner for his service as President of the Society.

Benson Speech

"Education and Free Enterprise" was the subject chosen by Dr. George S. Benson, nationally known president of Harding College and featured speaker for the banquet. Dr. Benson has been recognized throughout the country as one of the most convincing and inspiring exponents of the American Way now before the public. His work has been a major factor in awakening the American people to the danger awaiting complacency. He spoke with sincere conviction to the overflow audience of over 675 foundrymen and their ladies at the Terrace Casino.

The American culture is based on three factors, said Dr. Benson: the Christian religion; representative, constitutional government; and a private enterprise economy. Americans must guard against lethargy, Benson stressed, and the insidious Russian propaganda campaign that has been infiltrating every level of our society, particularly in churches and schools. Every high school should have a thorough course in American history, a subject that is not now required in many of our secondary schools. As Americans, we must educate our children to our way of life, since the child does not inherit an appreciation of his environment.

Alumni Dinner

At dinner for A.F.S. Alumni, comprising present and past National Officers, Directors, Medalists and Life Members, past National President Hyman Bornstein, Deere & Co., Moline, Ill., spoke on *"Israel and Its Industry."* Past President Walter L. Seelbach presided at the dinner, which was held on Thursday evening, May 7, in the Louis XVI Room of the Hotel Sherman.

Another feature of the Convention was the Past President's Breakfast, attended by past national presidents of A.F.S. With Walton L. Woody presiding, the breakfast was held on Thursday morning, May 7, in the Holiday Room of the Sherman.

Education Dinner

The A.F.S. Educational Division sponsored the Annual Education Dinner, held Tuesday evening, May 5. Then Vice-President, now President-Elect, Collins L. Carter presided and the guest speaker was H. E. Gravlin, Jr., Ford Motor Co., who discussed chapter educational activities.

A.F.S. members from north of the border gathered at the Annual Canadian Dinner on Tuesday evening, May 5, in the Morrison Cotillion Room. National Director J. J. McFadyen presided at an event that is a Convention tradition and an adventure in good fellowship.

Many veterans of A.F.S. and of the industry met their friends and co-workers of other years at the Convention. A special Old Timers Registration desk was set up to serve those foundrymen who had served more than 25 years in the industry. Service buttons were issued to these registrants.

Official exchange paper from the Institute of British Foundrymen was delivered by G. W. Nicholls, Modern Foundries, Ltd., Halifax, England, who presented his speech before a Gray Iron session. International cooperation in technology of this type is an annual feature of A.F.S. Conventions.

Three related metals societies and associations held meetings during the A.F.S. Convention. The annual dinner of the Non-Ferrous Founders' Society was held, together with a reception, in the Bismarck Hotel Walnut Room on Monday, May 4. A Board Meeting was conducted by the Foundry Equipment Manufacturers' Association on May 5, followed by the Association's Annual Reception in the Cotillion Room of the Hotel Morrison, on the evening of May 6. The Foundry Educational Foundation Trustees held a joint

meeting and luncheon on Thursday noon, May 7, in the Jade Room of the Hotel Sherman.

Plant Visits

A total of 42 foundries, equipment manufacturers, laboratories, and educational institutions in the Chicago vicinity cooperated closely with A.F.S., throwing open their plants and other facilities to Convention visitors through the week. Members and guests were given an excellent cross-section of the huge industrial concentration in the four-state area around the southern tip of Lake Michigan.

The Ladies

All ladies attending the Convention were provided with a full program of entertainment that extended from Monday, May 4, to Thursday, May 7. First event, on May 4, was the Official A.F.S. Ladies Tea in the New Mezzanine Room of the Hotel Sherman, from 3-5 p.m.

The famous Walnut Room of Marshall Field & Co. was the scene for a luncheon and fashion show on Tuesday, May 5. The ladies were treated to a full preview of late spring and summer styles.

On Wednesday, the ladies enjoyed a smorgasbord luncheon at the Kungsholm Restaurant, followed by an operatic puppet show for which this Near North Side inn is noted.

The formal program of entertainment for the ladies ended with a tea and reception on Thursday afternoon at the Art Institute of Chicago. The ladies also attended other events on the general program of the Convention, including the Annual Dinner. Friday was left open for personal engagements and shopping tours.

Mrs. Collins L. Carter pours for Mrs. Frank J. Dost at the annual A.F.S. Reception and Ladies' Tea.

Approximately 300 ladies registered during the Convention and enjoyed the four-day program planned for them by the Ladies Committee. The hospitality of the host Chicago Chapter and of new-found friends made the experience a memorable one.

The newly re-decorated Terrace Casino at Chicago's Hotel Morrison was the scene for the American Foundrymen's Society 1953 Annual Banquet. Almost 700 foundrymen and their ladies attended, honored medalists and life members, and heard a fighting speech on Americanism and free enterprise by Dr. George S. Benson, president of Harding College, Searcy, Ark.

The news report of the 1953 A.F.S. Convention technical program is appearing in the May and June issues of AMERICAN FOUNDRYMAN. In this issue, are resumes of papers and discussions at the Sand Reclamation Symposium and the meetings sponsored by the following divisions and committees: Brass & Bronze, Light Metals, Malleable, Educational, Heat Transfer, and Pattern. Continuing in June, "The Foundrymen's *Own* Magazine" will report on sessions sponsored by these divisions and committees: Sand Gray Iron, Safety & Hygiene & Air Pollution, Refractories, Time Study & Methods, Steel, Plant & Plant Equipment, and Cost.

Sand Reclamation Symposium

The Sand Reclamation Symposium, sponsored jointly by the Gray Iron, Sand, and Steel Divisions of A.F.S., was divided into two sessions of three papers each. At the first session, the speakers and their papers were: C. E. Wenninger, National Engineering Co., Chicago, *"Development of Foundry Sand Reclamation;"* H. W. Meyer, General Steel Castings Corp., Granite City, Ill., *"Reclamation of Sand by Pneumatic Dry Scrubbing;"* and J. A. Cannon, Duncan Foundry & Machine Works, Inc., Alton, Ill., *"Dry Reclamation of Molding Sand for Steel Castings."* J. A. Rassenfoss, American Steel Foundries, East Chicago, Ind., presided; R. H. Jacoby, Key Co., East St. Louis, Ill., was co-chairman.

Mr. Wenninger developed the background for the symposium by discussing the history of sand reclamation, some fundamental concepts, and past reclamation methods. Foundrymen were not much interested in reclamation of sand a quarter of a century ago, he said, without better methods of sand control, and reclamation equipment and methods. Starting in 1938, he went on, a successful wet reclamation method appeared, followed by several types of thermal reclaimers, and later pneumatic installations of various types.

Mr. Wenninger described the progressive deterioration of sand as it is re-used, pointing to the development of shells of binder around the grains, which crack and separate, producing many fine particles. Net result, he said, is an increase in fines and in out-size grains with resultant change in grain distribution. Another factor is the creation of "pickle" grains—small particles become embedded in coatings of old bond—which decrease flowability. Successful reconditioning of used sand, he asserted, requires treatment of the individual grains rather than the sand mass as a whole. Reconditioned sand will not perform like new unless the surface condition of the old grains is restored to a physical state comparable to that of new grains.

Mr. Meyer told of finding that certain sand grain coating characteristics affect the thermal stability of steel molding sands, and influence casting results. Proper mulling was found to greatly influence coating characteristics. Application of these findings led to greater use of reconditioned sand, selection of dry pneumatic scrubbing for reclamation, and finally complete elimination of new crude sand in an all-purpose steel molding sand mix.

Near the end of a five-year period, Mr. Meyer stated, thermal shock resistance of the all-purpose molding sand, in which used sand predominated, was observed deteriorating. The trend stopped when a higher pro-

James H. Smith, Central Foundry Div., General Motors Corp., delivered the Charles Edgar Hoyt Annual Lecture.

Prof. George J. Barker, University of Wisconsin, was awarded an Honorary Life Membership at the Annual Banquet.

President I. Richards Wagner, American Foundrymen's Society, addresses the annual Business Meeting of the Society.

portion of new sand was introduced, but cost became excessive when the amount of new sand introduced daily amounted to some 140 tons. Attempts to regain thermal shock resistance in some other way were fruitless until the nature of the sand grain coating was studied, said the speaker. It was discovered that grains uniformly and thinly coated gave best shock resistance, while grains heavily coated or non-uniformly coated imparted poor thermal properties to a sand mixture.

Get Good Thermal Characteristics

The condition could have been corrected, Mr. Meyer declared, through addition of 0.05 per cent of a polyelectrolyte but cost and the existing sand practice ruled this out. The solution was found in a pneumatic sand reclamation method based on impact of grain against grain, he said, which gave a reclaimed sand with thermal shock characteristics comparable to the new, crude sand used.

Mr. Cannon told how his company decreased the amount of new sand used by more than 75 per cent through dry pneumatic reclamation. (Full story appears in this issue, pages 68-73.)

Papers at the second Sand Reclamation Symposium session were: *"A Wet Method of Sand Reclamation,"* R. H. Shurmer and P. C. Will, Hydro-Blast Corp., Chicago; *"Sand Reclamation in a Steel Foundry,"* H. H. Johnson, R. Y. McCleery, and G. A. Fisher, National Malleable & Steel Castings Co., Sharon, Pa.; and *"Sand Reclamation with the Combination System,"* G. H. Curtis, Nichols Engineering & Research Corp., New York. Co-chairman of the meeting were T. W. Curry, Lynchburg Foundry Co., Lynchburg, Va., and G. M. Etherington, American Brake Shoe Co.

Mr. Shurmer described the construction and operation of a wet scrubber and classifier. Wet-reclaimed sand has a gray color which some foundrymen mistakenly believe is a coating of foreign material that will adversely affect the performance of the sand, he said. The appearance is due to a deposit within the surface imperfections of the grains and there is no adverse effect, he declared.

Enumerating the results of a number of practical tests in sand reclamation, Mr. Shurmer listed the following results to be expected with wet-reclaimed sands: casting finish, baked tensile strength with no increase in binder consumption, and sintering point equal to new sand; cost per ton substantially lower than that of delivered new sand; and grain distribution capable of closer control than that of new sand.

A wet system which reclaims about 1000 tons of sand a week was described by Mr. Johnson. He pointed out that the decision to reclaim sand was prompted by high freight costs of new sand and the problem of disposing of used sand. In the system, he said, the waste sand is put through a wet-type lump breaker, over a vibrating screen which removes lumpy material, then into a dewatering tank where oversize material and tramp iron are separated. Next in the system is a scrubber where grain to grain contact in vigorously agitated water scrubs off adhering fines and binder. The scrubbed sand then goes to a transfer tank and finally to a classifier.

In the classifier, Mr. Johnson said, acceptable sand settles against a rising current of water, the latter rejecting the unwanted material. Before use, the reclaimed sand is dewatered on a horizontal vacuum filter table, then stored or dried in a rotary, gas-fired drying kiln. Reclaimed sand is used in both molding and core sand mixtures, the speaker explained. He illustrated the success of the reclamation system with quality control charts showing the acceptability of properties and sand characteristics.

Reclamation of sand by a combination of wet scrubbing and burning was described by Mr. Curtis. The wet treatment, he asserted, removes the mineral binders and fines, while the high temperature treatment oxidizes organic matter. Essential features of the system are a breaker barrel (hard-to-break lumps are recycled or crushed in a hammer mill), wet scrubbers, classifier, dewaterer, vertical multi-hearth furnace (1200-1400 F), cooler, and storage bins.

Mr. Curtis pointed out that sands requiring removal of organic binders only could be given the thermal treatment without prior wet treatment. Among statistics cited were some showing that tensile strength of steel foundry core sand is increased markedly by the thermal treatment over the wet scrubbing treatment alone.

Brass & Bronze

The program of the Brass & Bronze Division consisted of three regular technical sessions—one devoted to fracture testing, a round table luncheon, and two

Discussing this year's outstanding technical papers program are, left to right: Wm. E. Adams, Chas. A. Krause Milling Co., and Jack G. Eberhardt and Norman S. Snow, Hardy Sand Co.

shop course meetings. The brass and bronze program opened with *"Properties of Graphitic Nickel Alloy Castings"* by J. T. Eash and G. L. Lee, International Nickel Co., Bayonne, N. J., and informal reports on brass and bronze research in progress by: W. B. Scott, National Bearing Div., American Brake Shoe Co., Meadville, Pa.; B. N. Ames, New York Naval Shipyard, Brooklyn; R. B. Fischer, Ingersoll-Rand Co., Phillipsburg, N. J.; and R. A. Colton, Federated Metals Div., American Smelting & Refining Co., Barber, N. J.

Mr. Lee described the development and properties of graphitic nickel alloys which, he said, could be easily cast into pressure-tight shapes having sharp definition and good surface quality. Cast nickel containing 1-2.5 per cent carbon, 2 per cent silicon, 1.5 per cent manganese, and 0.05-0.15 per cent magnesium in excess of sulphur has excellent anti-galling characteristics, a tensile strength of about 60,000 psi, and an elongation of 22 per cent. Graphite is present in spheroidal form. Increased strength can be achieved, according to the speaker, by adding tin which decreases toughness but increases resistance to seizure on rubbing contact.

Shown at the reception for the Annual Banquet speakers' table guests are: A.F.S. Vice-President-Elect Frank J. Dost; A.F.S. President-Elect Collins L. Carter; Dr. George S. Benson, President, Harding College, featured speaker at the Banquet; A.F.S. President Wagner; and A.F.S. Past-President L. N. Shannon, President, International Committee of Foundry Technical Associations. Mr. Shannon will preside at committee meetings at International Foundry Congress in Paris.

A.F.S. President I. R. Wagner awarded prizes to apprentice contest winners. Shown are George M. Smith, Automotive Pattern Co.; Richard Sautel, Universal Pattern Works; Joseph Lo Patriello, Airesearch Foundry; Robert Luckenbill, Dodge Steel Co.; and William E. Morehead, Caterpillar Tractor Co.

Examples of problems relating to mold-metal interface reactions were outlined by Mr. Scott. One study in progress seeks to find out how mold materials influence shrinkage and what relation they bear to mold atmosphere, rate of gas evolution, and the catalytic effect of metallic oxides. A second study of soot-coated cast iron chills and graphite chills shows that the nature of the movement of metal over a chill and the possibility of lateral surface permeability need to be considered to explain chill blows.

High rate of flow into a permanent mold cavity to get best surface finish appears to be dictated by a third study, Mr. Scott said.

Plan Radiographic Standards for Bronze

Mr. Ames described work leading toward establishment of practical radiographic standards for bronze castings. The approach is to correlate radiographic indications of defects with mechanical properties and hydrostatic tests of cast plates. Among results of work in its present state is the indication that elongation decreases almost linearly with increasing spherical gas porosity. At present, there is no firm correlation between hydrostatic pressure resistance and radiographic findings, Mr. Ames declared, although it appears that degree of microshrinkage may have a more pronounced influence than gas porosity.

Veining and burnt on sand (mechanical mixture of sand and metal) in copper-base alloys cast against cores were discussed by Mr. Fischer. He described an uncompleted investigation indicating that low dry permeability prevents penetration, that zircon sand prevents penetration, and that core washes will not eliminate penetration on higher permeability sands. Application of results of the tests, Mr. Fischer stated, have resulted in reduced cleaning time and improved surface finish.

Manganese bronze was cast into ingot molds, sand keel-block molds, and metal keel block molds in a project described by Mr. Colton. Test bars cut from specimens cast in the metal molds were essentially the same, he said, while sand-cast keel blocks gave lower properties. This indicates that rate of solidification, grain size, and grain orientation are critical variables in producing test bars in manganese bronze. No variation due to pouring over a range of 1800 to 1950 F was noted. Also, Mr. Colton said, it made no difference whether the castings were top-poured, bottom-gated, or whether insulating compositions were used on top, as far as tensile properties were concerned.

Presiding at the session was F. L. Riddel, H. Kramer & Co., Chicago; J. G. Dick, Canadian Bronze Co., Ltd., Montreal, was co-chairman.

Tell Fracture Test Value

The fracture test session had as speakers C. A. Robeck, Gibson & Kirk Co., Baltimore, Md., and B. N. Ames, New York Naval Shipyard, Brooklyn. W. M. Ball, Jr., R. Lavin & Sons, and F. L. Riddell, H. Kramer & Co., Chicago, were co-chairmen.

In urging foundrymen to make more extensive use of the fracture test for melt quality, which was developed under the direction of the A.F.S. Brass & Bronze Research Committee, Mr. Ball pointed out that he had seen many recent examples where this simple test

would easily have prevented production of many costly defective castings. He divided copper-base alloys into eight groups and suggested that the research should be extended beyond the present study of 85-5-5-5 to cover all classes of alloys.

Mr. Robeck analyzed the factors which influence acceptance of the A.F.S. fracture test, pointing out that such a separately cast specimen indicates melt quality only and not casting quality. His company uses the fracture test extensively, he said, for melts produced in large quantities, especially when metal from two or more furnaces must be combined to be poured into one mold. It has also been invaluable, he declared, in following quality deterioration caused by slow pour off of large batch melts.

Mr. Ames reported favorable results in determining melt quality with fracture tests and told of work done in fracture testing using Y-bars.

Causes of Macro-Gas Porosity

Segregation and gas porosity were subjects of papers at a third brass and bronze session. W. B. Scott, National Bearing Div., American Brake Shoe Co., Meadville, Pa., presided; co-chairman was R. A. Colton, Federated Metals Div., American Smelting & Refining Co., Barber, N. J. W. C. Winegard, University of Toronto, described the use of radioactive tin to study inverse segregation and to demonstrate that it occurs in very small castings.

Results of a study of more than 250 test castings poured to investigate macro-gas porosity as influenced by mold, binders, coatings, melting, and degassifying and deoxidizing practices were reported by R. B. Fischer, Ingersoll-Rand Co., Phillipsburg, N. J. A number of commercial sand additives were tested. Pitch-bonded molds produced no spherical type macro-gas porosity, while cement-bonded and natural sand molds gave practically none, according to the speaker. Synthetic and natural resins gassed the test castings in varying degrees while graphite coatings containing pitch and a special zircon-filled coating reduced gas porosity though they gave poorer casting finish, the speaker declared.

Program at the Brass & Bronze Round Table Luncheon featured a motion picture portraying research in gating small cylindrical castings and an informal, free-for-all discussion of operating practices. Narration of the film, which was produced at Battelle Memorial Institute, Columbus, Ohio, under the auspices of the Brass & Bronze Ingot Institute, was by Kenneth Grube of Battelle. B. A. Miller, Baldwin-Lima-Hamilton Corp., Philadelphia, was luncheon chairman; co-chairman was H. L. Smith, Federated Metals, Div., American Smelting & Refining Co., Pittsburgh.

Discuss Furnace Operation

Theme of the two shop course meetings was *"Furnace Operation and Practice."* R. J. Keeley, Ajax Metal Div., H. Kramer & Co., Philadelphia, and H. M. St. John, Crane Co., Chicago, were co-chairmen of both sessions. At the first, B. W. Schafer, Detroit Electric Furnace Div., Kuhlman Electric Co., Bay City, Mich., discussed *"Indirect Arc and Resistance Furnaces;"* F. T. Chesnut, Ajax Electrothermic Corp., Ajax Park, N. J., spoke on *"Low and High Frequency Induction Furnaces;"* and R. H. Stone, Vesuvius Crucible Co., Pittsburgh, talked on *"Coal and Coke Fired Furnaces."*

History of development of indirect arc and resistance furnaces was traced by Mr. Schafer who told how research in 1915 led to the construction of the first rocking type furnace from an old ether drum. Modern installations were described and illustrated to show proper application and operation of rocking furnaces for non-ferrous melting. Resistance type furnaces are generally less efficient than arc but are noiseless and give steady, high power factor, non-surge load.

Both low and high-frequency induction furnaces have the inherent advantage of vigorously stirring the melt, Mr. Chesnut stated in his presentation. Substantially all the heat energy is induced in the charge, resulting in low heat loss, he said. He pointed out that the low-frequency furnace operates best in continuous production because a heel of molten metal must be maintained and because thermal shock to refractories is minimized. He described the use of both lift-coil and tilting high-frequency induction furnaces for odd lot, specialty, and production jobs.

Mr. Stone estimated that some 200 shops use solid fuel for melting in crucibles, a few with hard coal, the large majority with bee-hive or by-product coke. Forced

C. J. Berg (left), Sherwin-Williams Co., spoke on pattern coating research. He shows display panels here to E. T. Kindt, Kindt-Collins Co.; and J. W. Costello, American Hoist & Derrick Co. Mr. Kindt was chairman of meeting. Mr. Berg's paper appears in its entirety in this issue (pages 80-86).

The Fracture Test Symposium of the Brass and Bronze Division drew a large audience. Pictured (l. to r.), F. L. Riddell, H. Kramer & Co.; William M. Ball, Jr., R. Lavin & Sons; Bernard N. Ames, New York Naval Shipyard; and C. A. Robeck, Gibson & Kirk Company of Baltimore, Maryland.

draft furnaces give faster melting than natural draft units, he said, explaining that the difference probably lies in the more complete combustion achieved with forced draft. Though crucible life in number of heats is lower with solid fuels, total time in the furnace per crucible is about the same as with gas or oil since the solid fuel melts slower.

J. L. Stroman, Stroman Furnace & Engineering Div., Peterson Oven Co., Franklin Park, Ill., spoke on *"Gas and Oil Fired Furnaces"* at the second shop course meeting. Martin G. Dietl, Schaible Foundry & Brass Co., Cincinnati spoke at the same session on *"Furnace Practices."*

Every effort should be made, Mr. Stroman said, to place the furnaces in a room separate from the molding floor so that undesirable fumes and heat can be vented off independently. He continued his discussion by outlining preferred floor layouts, metal storage practice, and selection of melting unit and fuel. He warned against dropping runners and scrap castings into molten metal to lower the temperature, saying that it is a certain invitation to trouble. Another practice he advised against was stirring the metal before removal from the furnace—disturb it as little as possible, he said.

Light Metals

The Light Metals Division introduced titanium to the foundry industry through papers at two sessions, held three other sessions on aluminum and magnesium, and conducted a round table luncheon meeting on shell molding.

At the light metals session, K. E. Nelson, Dow Chemical Co., Midland, Mich., presented *"Magnesium Sand Casting Alloys Containing Thorium"* and J. W. Meier, Department of Mines & Technical Surveys, Ottawa, Ont., presented *"Characteristics of High Strength Magnesium Casting Alloy ZK61."* Chairman and co-chairman, respectively, were A. T. Peters, Dow Chemical Co., Bay City, Mich., and W. D. Danks, Howard Foundry Co., Chicago.

Mr. Nelson discussed an extensive evaluation of magnesium casting alloys with particular reference to their resistance to creep at elevated temperatures such as are encountered in jet aircraft applications. Separately cast test bars and specimens cut from special test castings were used. In order of increasing creep resistance, he listed the following classes of alloys: (1) magnesium-aluminum-zinc; (2) magnesium-rare earth-zirconium; and (3) magnesium-thorium-zirconium.

Aircraft Alloy Harder to Cast

The magnesium-base alloy ZK61 has the highest strength-to-weight ratio of any commercial casting alloy, Mr. Meier said in outlining recent work done in the laboratory and performance in actual service of Mg-Zn-Zr casting alloys. He gave properties obtained with test bars and in prototype aircraft castings, citing figures for various heat treatments. Handling of ZK61 in the foundry requires somewhat more care than the older Mg-Al-Zn casting alloys with low zinc content, he asserted.

"Magnesium Alloy Permanent Mold and Semi-Permanent Mold Castings," by M. E. Gantz, Jr., E. M. Gingerich, and R. T. Woods, Aluminum Company of America, Cleveland, first of three light metals papers at another light metals meeting, outlined current status of the art of casting magnesium in permanent and semi-permanent molds. In addition to reviewing design considerations, mold design and operation, and applications, the authors called attention to two significant developments of recent years. The first was the discovery that very small amounts of beryllium added to the alloys reduced their tendency to burn and react with the mold wash. Second was the discovery that grain refinement could be achieved through treatment of molten metal with solid organic chlorides.

In a paper entitled *"Agar Gels in Plaster-Bonded Investment,"* H. Rosenthal and S. Lipson, Frankford Arsenal, Philadelphia, showed that 0.1-0.2 per cent by weight agar additions to investment mixtures arrested the mobility of the investment when used as dipping precoat, and suppressed the collection of free water on the under side of the patterns when used as a single coat investment.

Reporting on an investigation of Al-4%Cu alloys, William D. Walther, Clyde M. Adams, and Howard

W. S. Pellini (right) addresses a Heat Transfer Session. Others at table are Co-Chairman J. B. Caine, Consultant; and Chairman C. E. Sims (center), Battelle Memorial Institute.

F. Taylor, brought out that a cast fibered structure results from preferred distribution of gas porosity along grain boundaries. As a consequence, mechanical properties have marked directional nature and compare favorably with wrought material when fibers are favorably oriented in test bars.

Chairman of the light metal session was W. A. Mader, Oberdorfer Foundries, Inc., Syracuse, N. Y. D. L. LaVelle, Federated Metals Div., American Smelting & Refining Co., Barber, N. J., was co-chairman.

Applies Research-Developed Gating System

T. D. Stay, Reynolds Metals Co., Cleveland, and P. J. Petto, Jr., Fairfield Aluminum Co., Fairfield, Iowa, were co-chairmen of a light metal session featuring two papers on gating. L. L. Lucas, Wagner Manufacturing Co., Sidney, Ohio, told how his company had markedly reduced rejects and rework of aluminum alloy castings through application of the principles of ratio gating. The recommendations of the Light Metals Research Committee as portrayed in the A.F.S. films on metal flow form a sound basis for developing gating systems, he said.

"Velocities and Volume Rates of Metal Flow in Gating Systems," by W. H. Johnson, H. F. Bishop, and W. S. Pellini, Naval Research Laboratory, covered the flow of metals from gating systems as measured by photographic and electronic measurements. The work related only to effects prior to the development of back pressure due to rise of metal in the mold. The authors indicated that the effect of sprue height is dependent on whether the gating system is choked or free-flowing. For systems which remain free-flowing, the quantity of metal delivered is determined almost entirely by sprue cup conditions; flow velocities are determined primarily by conditions in runners and fingergates. For choked systems, volume rates are determined by the degree of choking and velocities are strongly influenced by sprue height.

How to Cast Titanium

At the first of two sessions on titanium, O. W. Simmons and H. R. McCurdy, Frankford Arsenal, Philadelphia, presented *"A Technique for Casting Titanium,"* and Simmons and R. E. Edelman presented *"Mechanical Properties of Cast Titanium-Carbon Alloys."* Presiding was J. H. Jackson, Battelle Memorial Institute, Columbus, Ohio; H. Rosenthal, Frankford Arsenal, was co-chairman.

The technique for casting titanium was based on a direct-arc furnace developed at Frankford Arsenal for making castings weighing about 1½ lb. Melting and casting are carried out in a furnace with mold attached, the whole surrounded by a water-cooled, gas-tight, copper box to prevent contamination from the atmosphere. Melting is carried out in an inert atmosphere of purified argon, the researchers reported, using a water-cooled, tungsten-tipped electrode as the cathode, and the titanium as the anode. Instead of the customary refractory lining, the unmelted titanium skull (side and bottom portions of an ingot charged) provided the container for the molten metal.

The second paper covered properties of titanium-carbon alloys made in the special furnace, the carbon

Chairman F. J. Walls (left), International Nickel Co., head of A.F.S. Board of Awards, is shown with 1953 group of honorees. Others (from Mr. Walls): William J. Grede, Grede Foundries, Inc., winner of McFadden Gold Medal; Daniel E. Krause, Gray Iron Research Institute, Whiting Gold Medal; James H. Smith, General Motors Corp., Simpson Gold Medal; William Romanoff, H. Kramer & Co., Seaman Gold Medal; A.F.S. President I. R. Wagner, Electric Steel Casting Co., and Prof. G. J. Barker, University of Wisconsin. Messrs. Wagner and Barker were honored with Life Membership in the American Foundrymen's Society.

This group is shown at the Light Metals Round Table Luncheon. From left: N. Sheptak, Dow Chemical Co.; L. J. Schmieder, Jr., Oberdorfer Foundries, Inc.; Hiram Brown, Solar Aircraft Co. Standing: A. J. Marotta, Utica Radiator Corp.; and F. P. Strieter, Dow Chemical Co. They led discussions of shell mold casting of light metal alloys.

A distinguished group of educators and industrialists met at the Education Dinner. At the speaker's table are (l. to r.): Dr. J. T. MacKenzie, American Cast Iron Pipe Co.; Prof. George J. Barker, Univ. of Wisconsin; E. J. Walsh, Foundry Educational Foundation; Earl M. Strick, Erie Malleable Iron Co.; and Prof. Roy W. Schroeder, University of Illinois, Chicago.

Here is the receiving line at the President's Reception. Officers and officers-elect welcomed guests.

The President's Reception saw many cordial groups such as this. Shown (l. to r.), Mrs. M. J. Lefler, A.F.S. Director-Elect Martin J. Lefler, Oliver Corp.; Mrs. Walter W. Moore, Mr. W. W. Moore, Burnside Steel Foundry Co.; and H. Kenneth Briggs, Miller & Co.

ranging from 0.04 to 0.90 per cent. As carbon increased, there was a gradual increase in strength, and a severe decrease in ductility due to the increasing amount of carbide formed. The marked loss in ductility, the authors pointed out, rules out induction melting in a graphite crucible if ductile castings are required. No other refractory crucible material is known which will produce less seriously embrittled metal. Ductility through heat treatment is an unlikely prospect, they stated, the only immediate benefit of heat treatment being stress relief.

W. A. Dean, Aluminum Company of America, Cleveland, and R. A. Lubker, Armour Research Foundation, Chicago, were co-chairmen of the second titanium session. Papers presented were *"Evaluation of Mold Materials for Titanium Castings,"* R. M. Lang, J. G. Kura, and J. H. Jackson, Battelle Memorial Institute, and *"Preliminary Survey of Some Metallurgical Bases for a Titanium Castings Industry,"* S. V. Arnold, Watertown Arsenal, Watertown, N. Y., and R. F. Malone, H. T. Clark, and W. L. Findlay, Rem-Cru-Titanium, Inc., Midland, Pa.

A sound metallurgical basis does exist for a titanium castings industry, the four authors concluded from their investigation which brought out affirmative answers to the following key questions: Does a non-contaminating mold material exist? Can contamination-free, chemically-homogeneous titanium alloy castings be made by a procedure offering a possibility of large scale-up? Can non-porous, good-surfaced, accurately-dimensioned titanium castings be made? Would titanium castings have the promising mechanical properties of their wrought counterparts? During the investigation, castings up to 25 lb. in weight were melted and poured from a "skull" furnace into a carbon or graphite mold within an argon atmosphere.

The Light Metals Division held its round table luncheon at noon the first day. Featured were a formal paper, *"Castings Magnesium Alloys in Shell Molds,"* by N. Sheptak, Dow Chemical Co., Midland, Mich., and a discussion of shell molding led by J. L. Schmieder, Jr., Oberdorfer Foundries, Inc., Syracuse, N. Y., and A. J. Marotta, Utica Radiator Corp., Utica, N. Y. F. P. Strieter, Dow Chemical Co., Midland, presided.

Mr. Sheptak reviewed tests developed for evaluating sand-resin mixes, a study of the effectiveness of inhibitors, work on ease of shell breakdown, and on cooling rates of shell-cast metal. Magnesium castings were successfully produced in shell molds when inhibitors were used as sand additives or as mold washes, he said. He recommended 0.5-1.0 per cent ammonium borofluoride in the sand, and boric acid and a proprietary compound as mold washes.

Shell Cores for Aluminum

In discussing production of shell cores for aluminum castings, Mr. Schmieder pointed out that first attempts are not always successful and repeated trials may be necessary. An advantage of shell coring is the better casting surface finish attained. It is possible to make cores impossible to produce by usual methods, he added. Some of the techniques of core making mentioned by Mr. Schmieder were by dump box, blowing, centrifuge, and combination dump and blow.

Mr. Marotta said his company is interested in casting magnesium in shell molds because of the possibly broadened scope of casting that can be made, the reduced floor space required, better castings, and reduced costs. He used potassium fluoborate and sulphur as inhibitors in the shell, Mr. Marotta stated, and flushed the mold cavity with sulphur dioxide immediately before pouring. Same aluminum patterns used in the green sand foundry were used for shell molds, he declared, but it has not yet been determined whether they can be used for long production runs. Reduced scrap is indicated by experiments to date, he said.

Malleable Iron

Four technical sessions and a round table luncheon were staged by the Malleable Division. Mechanization of malleable shops was described by R. J. Anderson, Belle City Malleable Iron Co., Racine, Wis., and by J. G. Kropka, Chain Belt Co., Milwaukee. W. G. Ferrell, Auto Specialties Co., St. Joseph, Mich., and L. E. Roby, Peoria Malleable Casting Co., Peoria, Ill., were co-chairmen at the first malleable session.

Mr. Anderson told how his company had mechanized and improved its work methods with a resultant reduction in costs and improvement in casting quality. Both mechanization and improved methods are essential, he declared, to achieve maximum savings. He recommended improved work methods particularly to the smaller shops with limited funds for investment

in equipment. Mechanization calls for a good preventive maintenance program to minimize down time, the speaker warned.

Mr. Kropka described Chain Belt's 9-man stack molding unit which gives high production in comparatively little space. Using accurate pattern plates, and flasks with carefully aligned and sized bushings and pins, molders produce mold sections by jolting and squeezing. The upper face of the section has the drag half of a mold cavity pressed into it by the upper pattern plate, the lower face has the cope half of a cavity. When stacked, the sections form six to eight complete sets of mold cavities with a single sprue.

Multiple stack molding was adopted, said Mr. Kropka, because of the basic economic factors involved. Maximum economy can only be achieved, he continued, with effective continuity of operation. Choice of the proper type of molding machine is highly essential for the production of good castings in multiple molding. Mr. Kropka described methods of sand handling, molding, pouring, and shake-out operations that have proved successful in his foundry. Standardization of tests and equipment is necessary to meet specifications and production requirements and to insure high quality of output.

Recommends Furnace Design

The second malleable session had as co-chairmen C. O. Schopp, Link-Belt Co., Indianapolis, Ind., and N. Amrhein, Federal Malleable Co., West Allis, Wis. First speaker was J. E. Rehder, Canada Iron Foundries, Ltd., Montreal, who discussed design and operational principles of air furnaces developed through operating experience. Among other suggestions, the speaker advised that a side wall slope about 1/3 in. per ft from the burner end wall to a few feet short of the bridge, with a sharper slope to the bungs over the bridge wall, gives most rapid and uniform heating. Top of the bridge wall, he said, should be only 2 to 5 in. above the metal line when the furnace is full. He gave tables of correct furnace dimensions and firing rates.

The second progress report on the Malleable Division research project, *"Effects of Melting Furnace Atmosphere on Casting Properties and Annealability of Malleable Iron,"* was presented by E. A. Lange and R. W. Heine, University of Wisconsin, Madison. They worked with 9-lb heats of white iron melted by induction in atmospheres containing air, moisture, CO, CO_2, N_2, H_2, and A, introduced separately to study their individual effects. Earlier work by the investigators had been done with siliceous linings; the work reported in 1953 was done in magnesia crucibles to eliminate silica pickup, according to the authors. Among the numerous, detailed conclusions reached were: the gases (other than air which oxidizes manganese and silicon) appear to be neutral toward silicon and manganese; no silicon losses will occur at elevated temperatures unless free oxygen exists in the furnace gases (or FeO is introduced from some source); net changes in silicon are the best measure of severity of oxidizing or reducing conditions; CO and CO_2 are virtually equivalent in effect on mottling tendency; a carbon range of minimum hot tear resistance exists; melting furnace gases can have a greater effect on nucleation of graphite, nodule count, and carbide stability than does carbon percentage in the iron or temperature of the iron during high temperature stage of melting.

More than 3500 foundrymen attended the 1953 A.F.S. Convention and Foundry Congress at Chicago. Scenes like the above were common in convention headquarters.

The Registration booths were constantly busy processing registrants on the mezzanine of the Hotel Sherman.

In describing their recent work, J. T. Bryce, A. Hernandez, and F. B. Rote, Albion Malleable Iron Co., Albion, Mich., concluded that some decarburization during annealing of malleable iron is inevitable within the limits of the metal analyses studied. They further stated that nodule formation and elimination play a significant role in determining the depth and character of the rim and that nodule control and control of decarburizing rate are the key to rim control.

Reduces Slag Defects

F. J. McDonald, Saginaw Malleable Iron Plant, General Motors Corp., Saginaw, Mich., outlined a study of pouring rate and its effect on castings, as influenced by sprue cups, sprue size, ladle height, runner cross-section, and skim cores. Among other conclusions, Mr. McDonald reported that slag defects are minimized when iron velocity in the runner is reduced. A skim core in the cope is most effective in reducing pouring rate while a skim core in the runner is practically ineffective. Instead of skim cores, he advised using smaller sprue diameter or choking the runner to control pouring rate. Pouring guide bars have been installed on all conveyor lines to give constant pouring height, he said.

Co-chairmen of this malleable meeting were W. D. McMillan, International Harvester Co., Chicago, and J. Dvorak, Eberhard Mfg. Co., Cleveland.

The paper at the fourth malleable session dealt with

Pictured at the Canadian Dinner are (l. to r.) John Perkins, Ford Motor Co. of Canada, Ltd.; Leo F. Dennie, Black Products Co.; Everett C. Reid, Ford of Canada; and Alex Pirrie, Standard Sanitary & Dominion Radiator, Limited.

Sand sessions attracted large, overflow audiences such as this one that gathered in the Grand Ballroom of the Sherman. This was characteristic of all the meetings at the Society's most successful non-exhibit convention.

W. A. Mader is shown opening a Light Metals Session on Monday, May 4. Others at speakers table are (l. to r.): S. Lipson, Frankford Arsenal; J. L. Schmieder, Jr., Oberdorfer Foundries, Inc.; W. D. Walter, Massachusetts Institute of Technology; E. M. Gingerich, Aluminum Company of America; and D. L. LaVelle, Federated Metals Div., ASARCO.

graphitization in cupola-air furnace irons. Entitled *"Graphitization in the Malleable Industry,"* it was written by H. A. Schwartz, W. K. Bock, and J. D. Hedberg, National Malleable & Steel Castings Co., Cleveland. Presiding was C. F. Semrau, Illinois Malleable Castings Co., Chicago; co-chairman was F. Czapski, Chicago Malleable Castings Co.

In the first paper, the author's studied graphitization rates of more than 200 specimens poured by three foundries. Silicon is by far the most important element in influencing graphitization, its potency varying with melting conditions which also affect nodule number, cupola carbon, and cupola silicon, they reported. The effect of these variables on the potency of silicon is further modified by heating rate in annealing, slow heating tending to make the potency in all materials more nearly alike. Changes in potency are closely paralleled by changes in nodule number, they indicated.

Sand Controls

At the Malleable Round Table Luncheon, R. J. Anderson, Belle City Malleable Iron Co., Racine, Wis., presided and W. A. Kennedy, Grinnell Co., Inc., Providence, R. I., acted as co-chairman. *"How Far Should a Malleable Foundry Go in Sand Controls,"* was presented by E. E. Woodliff, Foundry Sand Service Engineering Co., Detroit. He pointed out that control of core sand or molding sand in malleable foundries is not difficult providing that it has the backing of management, supervision, and the workmen. Sands require different types of control in each foundry because of the various combinations of sands and binders used, he said. Better castings will result with engineered sands, Mr. Woodliff stated, calling attention to the industry's concentration on equipment and comparative neglect of sand control.

The speaker outlined the following 10-point sand control program.

10-Point Program

1. Control sand to improve casting quality and workability as well as to reduce scrap.
2. Make control of sands for molding and coremaking a policy of management.
3. Establish whether synthetic, natural, or semi-synthetic sands are best suited to the foundry's class of work and production set-up and take advantage of effective clay content through proper mixing.
4. Control thermal expansion.
5. Keep in mind that casting finish is a product of grain distribution, flowability, relative moisture and clay content, and mold atmosphere.
6. Select the correct grade of seacoal—*E* and *D* are best for malleable iron.
7. Select a base sand for cores that is compatible with the molding sand. Measure batches accurately.
8. Control core sand toughness through strength (developed through binders) and plasticity (developed through cereal binder and moisture).
9. Take advantage of the various types of core binders to make most effective use of baking equipment and of the core properties which can be developed.
10. Control core collapsibility through sand selection, proportion of fines and clay, and iron oxide and

other non-burning materials which can be used to increase hot strength needed to overcome too-early collapse of cores.

Education and Training

The Educational Division, with Prof. George J. Barker, University of Wisconsin, as Chairman; and William J. Hebard, Continental Foundry & Machine Co., as Co-Chairman, held two sessions and a dinner during the Convention.

Prof. Barker was chairman of the first session, held at 2 pm on Monday, May 4; and Mr. Hebard shared the chair. E. R. Andrews, Hyde Windlass Co., Bath, Maine, spoke on *"Job Training in the Foundry."* He was followed at the lectern by Theodore Miller, Great Lakes Founders & Machine Corp., who discussed the same subject.

Mr. Andrews described his company's system of apprentice training, which has paid excellent dividends since the War. He particularly stressed the importance of proper selection of candidates and related his experience in the use of 11 avocational and psychological tests in screening. Following a controlled selection, Hyde Windlass uses a program of planned work schedules to acquaint the trainees with all phases of their work, and supplements this procedure with related training courses.

Different Angle

Mr. Miller's organization has approached the training problem from a different angle. His is a relatively new company, operating in an area of short labor supply. On the job training, with all men entering the plant through the shakeout crew and working up through both seniority and ability, has proved very adequate. This method stresses specialist training rather than broad education in all phases of the foundry operation.

A general discussion on *"The Foundry Industry and Formal Education"* highlighted the second session of the Educational program, held on May 5 at 2 pm. Chairman for this meeting was E. M. Strick, Erie Malleable Iron Co. He was assisted by co-chairman Prof. R. W. Schroeder, Univ. of Illinois, Chicago.

Discussions Followed

Discussions followed presentations by two speakers, B. D. Claffey, Acme Aluminum Alloys, Inc.; and F. G. Sefing, International Nickel Co., Inc. Mr. Claffey briefly outlined training problems in three general types of foundries, the so-called captive shops, the mechanized jobbing shops, and those small, privately-owned foundries that operate on a limited basis. Employee training is obviously different in each case and Mr. Claffey offered valuable suggestions for each group. He particularly emphasized that the foundry should be "sold" to high school and trade school students as a good place to work. Only through such good public relations could the industry recruit a sufficient number of worker replacements.

Mr. Sefing showed the serious need for closer liaison between the industry and the schools. He hammered away at the necessity for educating the teachers first, since they are best situated to carry our message to the

These foundrymen comprised the panel at the Brass and Bronze Shop Course, held Monday night, May 4. From left, B. W. Schafer, Detroit Electric Furnace Div., Kuhlman Electric Co.; F. T. Chesnut, Ajax Electrothermic Corp.; Chairman R. J. Keeley, H. Kramer & Co.; H. M. St. John, Crane Co.; and R. H. Stone, Vesuvius Crucible Co., Pittsburgh.

Shown here are W. B. Scott (from left), National Bearing Div., American Brakeshoe Co.; H. L. Smith, Federated Metals Div., American Smelting & Refining Co.; session chairman B. A. Miller, Baldwin-Lima-Hamilton Corp. Scene was the Brass and Bronze Round Table Luncheon at Hotel Sherman.

Another view of speakers' table at Education Dinner. From left: William J. Hebard, Continental Foundry & Machine Co.; Fred G. Sefing, International Nickel Co.; Frank J. Dost, Sterling Foundry Co.; Harry E. Gravlin, Jr., Ford Motor Co., speaker of the evening; and A.F.S. President-Elect and Chairman of the Dinner, C. L. Carter, Albion Malleable Iron Co.

Principals at Malleable Round Table Luncheon are shown here. From left, Chairman R. J. Anderson, Belle City Malleable Iron Co.; E. E. Woodliff, Foundry Sand Service Engineering Co., who spoke on sand control; and Co-Chairman W. A. Kennedy, Grinnell Co., Inc. of Providence, R. I.

young men who are looking for a place in industry. Mr. Sefing spoke of the part that must be played by A.F.S. in this program, and the need for an Educational Director for the Society who could co-ordinate Chapter and National activities in this field. The principal work, however, must still be performed on the local level, where the foundry is closely integrated with its community.

The annual Educational Dinner was held on the evening of Tuesday, May 5, with A.F.S. President-Elect Collins L. Carter presiding. Principal speaker was H. E. Gravlin, Jr., Ford Motor Co., who delivered a brilliant speech on *"A Chapter Educational Activity Program."* Mr. Gravlin related the experiences of the Detroit Chapter in implementing its program of education. He indicated a five-point plan that included who to educate, what to tell them, what media to use, when to use it, and how often. Plant visitations, films, meetings with science clubs, speakers at universities—these were some of the methods Mr. Gravlin mentioned in his discussion. Good human relations is vital and Chapters cannot overdo planned publicity in which as many people as possible will learn about the foundry industry and the opportunities it offers for young men leaving school. The need is just as strong in the colleges, where Mr. Gravlin and his co-workers have found that there is a general lack of knowledge about the foundry as an industry among undergraduates.

Heat Transfer

Two sessions sponsored by the Heat Transfer Committee gave foundrymen a practical insight into the everyday application of heat flow into and out of foundry materials.

W. S. Pellini, Naval Research Laboratory, Washington, D. C., delivered an interpretive report on the first eight years of A.F.S. heat transfer research at a session presided over by H. A. Schwartz, National Malleable & Steel Castings Co., Cleveland, with J. B. Caine, foundry consultant, Cincinnati, as co-chairman.

Pointing out that heat transfer is the very basis of the foundry industry, Mr. Pellini described the science of solidification of metals which has evolved over the past eight years. The foundryman can never know too much about practical heat transfer, he said, adding that the principal aim of the Society-sponsored research is to develop a better working or "thinking" tool for the industry. Mr. Pellini told how work with the electrical analogue (simulates heat flow by means of electrical circuits) had been verified on the foundry floor and explained how "start of freeze" and "end of freeze" curves define the specific nature of freezing for a given metal in a given mold system.

At the second heat transfer session, V. Paschkis, Columbia University, described the first work carried out under the A.F.S. Heat Transfer Committee dealing with heat flow in two directions. Previous work, he said, had dealt with simplified cases of flow in one direction only. He mentioned the difficulties of work along present lines and pointed to the need for perfecting experimental technique.

A paper by F. A. Brandt, H. F. Bishop, and W. S. Pellini, Naval Research Laboratory, extended previous work with plate and bar castings to cover bushings, *L* and *T* section. Studying solidification by thermal analysis, the authors established that *L* and *T* sections require 1⅓ and 1½ longer time for solidification than flat plates. For bushings the time is longer than flat plates, they brought out, by an amount which depends on the core diameter; the effect does not exceed 15 per cent, a figure obtained with core diameters of ¼ to ½ the wall thickness.

Co-chairmen of the second heat transfer session were E. C. Troy, foundry engineer, Palmyra, N. J., and F. T. McGuire, Deere & Co., Moline, Ill.

Patterns and Patternmaking

The Pattern Division staged technical meetings on patterns for shell molding and pattern coatings, and held their usual round table luncheon.

R. Olson, Production Foundry & Pattern Co., Chicopee, Mass., offered numerous practical hints for the construction of shell mold patterns at the first pattern session. Such patterns, he said, are made primarily of aluminum or of cast iron, the aluminum being cheaper to process and especially adapted to experimental and medium production work. In some cases, he asserted, aluminum shell patterns have been replaced three times without exceeding the cost of initial cast iron equipment. Hazards in the use of aluminum patterns, he pointed out, are their susceptibility to nicks and bumps and damage inflicted when a sticking shell is removed with something metallic instead of with a stick or dowel.

O. C. Bueg, Arrow Pattern & Engineering Co., Erie,

Cleveland is Next!!

Next year's A.F.S. Convention and Exhibit will be held in the Municipal Auditorium, Cleveland, May 8 through 14. Back in Cleveland for the ninth time, the 58th A.F.S. Foundry Congress will feature an exhibit of latest developments in equipment and supplies — the tools of the foundry industry — displayed against a background of meetings covering every phase of foundry operations and technology.

Pa., outlined a procedure for producing shell molding patterns. Because of the extreme accuracy and close tolerances involved, unusual care is required. First step is to determine whether the item is adaptable to the shell molding process, since it is not universally applicable. Another factor is the selection of proper alloys for producing the pattern equipment. Mr. Bueg then proceeded to point out the problems facing the foundryman who uses the shell mold process for production runs.

Vaughan C. Reid, City Pattern Foundry & Machine Co., Detroit, and H. J. Flaaten, Midwest Pattern Co., Minneapolis, were co-chairmen of the pattern session.

Why some pattern coatings are better than others and methods of testing coatings were explained by C. J. Berg, Sherwin-Williams Co., Chicago, at the second pattern session. E. T. Kindt, Kindt-Collins Co., Cleveland, presided and J. W. Costello, American Hoist & Derrick Co., St. Paul, Minn., was co-chairman. Mr. Berg evaluated shellac, crankcase sealer, and seven other coatings used on patterns in terms of build, total solids, brushability, drying time, drying time over wax, gloss, general appearance, and odor. These indicate a coating's package and application characteristics, he said.

Dry film characteristics are judged, Mr. Berg explained, by pencil hardness, flexibility, abrasion resistance, print resistance at 120 F, resistance to oil and water soluble core binders, gasoline resistance, and water penetration in 24 and 120 hours. He showed that few of the common coatings rate high in more than several coating characteristics, and that some outstanding for, say, abrasion resistance are extremely poor in preventing water penetration.

The paint industry is justifiably proud of its superior coatings, Mr. Berg declared, adding that there is still room for improvement and that patternmakers can demand and obtain pattern coatings as they want them. (The entire paper starts on page 80.)

Patternmakers at the Convention were joined by a group of apprentices from Washburne Trade School at the Pattern Round Table Luncheon. A. F. Pfeiffer, Allis-Chalmers Mfg. Co., Milwaukee, presided and H. K. Swanson, Swanson Pattern & Model Works, East Chicago, Ind., was co-chairman. A broad discussion of pattern making problems and techniques left round table participants with the conviction (strengthened by many such discussions) that co-operation between the patternmaker, the foundryman, and the designer are essential to most economical and efficient pattern production.

Speaker H. A. Schwartz, National Malleable & Steel Castings Co., Co-Chairman F. A. Czapski, Chicago Malleable Castings Co.; and Chairman C. F. Semrau, Illinois Malleable Castings Co. prepare for Malleable Session program.

The program for the ladies of the Convention was a full one. Shown here is a group at the A.F.S. Reception and Tea, held in the Hotel Sherman on Monday afternoon, May 4.

The Annual Business Meeting was held in the Grand Ballroom of Hotel Sherman. Program participants are shown on the stage. The Annual Hoyt Lecture was a feature of the event.

The 1953 Annual Convention and Foundry Congress of the American Foundrymen's Society was the most successful non-exhibit meeting in the 56-year history of the Society. The registration on Friday, May 8, last day of the Convention, was over the 3,500 mark—largest for a non-exhibit convention.

Because this was a non-exhibit year and the international aspect was not emphasized as strongly as in 1952, the number of members and guests attending from other countries was not as large as last year. However, a number of European foundrymen were in evidence during the sessions. The Canadian contingent was large and contributed invaluably to the success of the Convention. The traditional Canadian Dinner and Fellowship Hour was a cordial event, as usual.

Success of the Convention was assured, not only by the work of the divisions and committees, the National Headquarters staff and the host Chicago Chapter of A.F.S., but by the unfailing cooperation of authors, lecturers, session chairmen, discussion leaders, recorders, and their companies. Interest ran high among the audiences and floor questions were frequent and contributed materially to the meetings.

Editor's Note: News coverage of 1953 A.F.S. Convention sessions and events will be concluded in the June issue of *American Foundryman*.

American Foundrymen's Society Elects New Officers and Directors

Collins L. Carter

Frank J. Dost

THE new slate of National Officers and Directors of American Foundrymen's Society was elected at the Annual Business Meeting, held during the Convention in the Grand Ballroom of the Hotel Sherman on May 7, 1953.

Selected as President of the Society for the year 1953-54 was **Collins L. Carter,** President and General Manager, Albion Malleable Iron Co., Albion, Mich. The new Vice-President is **Frank J. Dost,** President, Sterling Foundry Co., Wellington, Ohio.

Directors

Five National Directors were chosen, all for three-year terms. They are: **E. C. Hoenicke,** General Manager, Eaton Mfg. Co., Foundry Div., Detroit; **Martin J. Lefler,** Plant Manager, Oliver Corp., South Bend, Ind.; **C. V. Nass,** Vice President, Beardsley & Piper Div., Pettibone Mulliken Corp., Chicago; **Victor F. Stine,** Vice President and Sales Manager, Pangborn Corp., Hagerstown, Md.; and **G. Ewing Tait,** Manager of Foundries, Dominion Engineering Works, Ltd., Montreal, Quebec, Canada.

Biographies

Collins L. Carter, President-Elect, climaxes a long career of outstanding service to A.F.S. by taking office as head of the Society. He is President and General Manager, Albion Malleable Iron Co., Albion, Mich., where he has spent his entire business career since leaving Cornell University in 1929. Mr. Carter began with Albion in that year as a supervisory trainee, progressed to salesman in 1953, became sales manager in 1936, and was promoted to his present position in 1938. He served the armed forces as a major of infantry, 1941-44. His organizational work has included the presidency of Malleable Founders' Society and of National Castings Council, and director of Malleable Founders' Society. He took an active role in the formation of the A.F.S. Central Michigan Chapter.

Frank J. Dost, Vice-President-Elect, is President, Sterling Foundry Co., Wellington, Ohio. He was born in Brooklyn, N. Y. and received his engineering training at the University of Cincinnati. Starting as student apprentice at the Cincinnati Milling Machine Co., Cincinnati, he joined Williams & Co., Inc., Cincinnati and Cleveland, in 1929 as foundry engineer, working largely in alloy cast iron development. He became affiliated with Sterling Foundry Co. in 1933, became president in 1952.

Mr. Dost has written extensively for the technical press on the manufacture and use of high-test alloy iron castings in machine tool construction.

Officers

President

Collins L. Carter
Albion Malleable Iron Co.
Albion, Mich.

Vice-President

Frank J. Dost
Sterling Foundry Co.
Wellington, Ohio

Directors

E. C. Hoenicke
Eaton Mfg. Co., Foundry Div.
Detroit

Martin J. Lefler
Oliver Corp.
South Bend, Ind.

C. V. Nass
Beardsley & Piper Div.
Pettibone Mulliken Corp.
Chicago

Victor F. Stine
Pangborn Corp.
Hagerstown, Md.

G. Ewing Tait
Dominion Engineering Works, Ltd.
Montreal, Quebec

A. F. S. Secretary-Treasurer, William W. Maloney, announces 1953 elections.

Victor F. Stine, Director-Elect, Vice-President in charge of Sales and Engineering, Pangborn Corp., Hagerstown, Md., has spent more than 40 years in the blast cleaning business, all of them with Pangborn. After serving as accountant, auditor, assistant treasurer, assistant secretary, secretary, and second vice-president, he was promoted to his present position. Mr. Stine, a former Director of Chesapeake Chapter, A.F.S., is a 25-year member of the Society. He has also been a director of the Foundry Equipment Manufacturers Association.

G. Ewing Tait, Director-Elect, Assistant Manager of Manufacturing, Dominion Engineering Works, Ltd., Montreal, Quebec, Canada, has had a long affiliation with A.F.S. Eastern Canada Chapter. He has been very active in education work in the Society, and in American Society for Metals. Mr. Tait was graduated as a mechanical engineer from McGill University in 1930.

Edward C. Hoenicke, Director-Elect, and General Manager, Eaton Mfg. Co., Foundry Div., took engineering courses at Detroit's Case Technical School. He served an apprenticeship as manufacturing trainee in foundry operation, pattern making, tool design, and machine construction. He spent several years with General Motors Corp. as foundry expediter, and became sales manager of the foundry division, Holley Permanent Mold Machine Co. in 1933, and General Manager in 1945. Mr. Hoenicke has served extensively on various war production boards in Washington, and was the first head of the Gray Iron Casting Section. He is a past chairman of the Detroit Chapter, A.F.S., and has held several posts in ASTM, FEF, NFA, Gray Iron Founders' Society, and National Castings Council.

Martin J. Lefler, Director-Elect, Plant Manager, Oliver Corp., South Bend, Ind., took his degree from Michigan State College in 1922. Beginning in 1924, he worked variously with Deere & Co., J. I. Case Co., Western Foundry Co., and Strom Brass Foundry before his permanent association with the Oliver Corp. in 1947. Mr. Lefler was a 2nd Lt. in the Army in 1918. He has been a longtime member of A.F.S.

C. V. Nass, Director-Elect, is Vice-President, Pettibone Mulliken Corp., Chicago, and general manager, Beardsley and Piper Division. After graduating from Tufts College in 1923, he entered the employ of the Ohio Brass Co., Mansfield, Ohio, as plant metallurgist until 1928. After one year with Humphryes Mfg. Co., Mansfield, he became brass foundry superintendent of Fairbanks, Morse & Co., Beloit, Wis., Works. There he progressed to assistant general superintendent of foundries. Mr. Nass is immediate past president of the Foundry Equipment Manufacturers Association, and is also a past president of the National Castings Council. He has taken an active part in the educational and technical committees of A.F.S. for many years, and is also a member of AIME, ASM, ASTM, and other industry organizations. Mr. Nass brings a broad background in foundry operation, management, and technology to the Directorship. His experience in trade association and technical society activities is also very wide in scope.

C. V. Nass

Victor F. Stine

G. Ewing Tait

Edward C. Hoenicke

Martin J. Lefler

Truce in Korea could have vital effect on the castings industry. Would an armistice bring depression to the foundry? AMERICAN FOUNDRYMAN seeks the answer in this survey.

What Price Peace . . .

If peace comes out of the truce tent at Panmunjom, the effect on the American foundry industry could be of far-reaching significance.

Where do we go from here? What happens to the foundry in the next six months, the next year, the next decade . . . ? Will defense cutbacks bring chaos into the castings business? Will civilian production take up the slack? Are dark days ahead?

American foundrymen are worried. Like all of the nation's businessmen, they are frankly concerned about the possible consequences of a Korean armistice.

In order to sound out the opinions of foundry management, its executives and planners, the editors of AMERICAN FOUNDRYMAN have queried representative men in all branches of the industry. Here are the results, the consensus among some of the foremost leaders about the effects of a Korean peace. Our questions and the aggregate response are listed.

What, in your opinion, would be the immediate effect of a Korean truce on the foundry industry?

Our respondents generally minimized the immediate effect of a truce on the industry. No noticeable adjustment was forecast by 11.7 per cent; 35.5 per cent thought there would be a slight leveling-off and adjustment of defense contracts; 35.2 per cent anticipate a temporary period of realignment; and 17.6 per cent are convinced that truce in Korea would bring an immediate and severe drop in the industry.

A 10-15 per cent reduction in current defense activities is the general feeling, both among foundry executives and in Washington. However, the adjustment could easily become a leveling-out of present orders rather than out-right cancellation.

"The . . . truce will have little effect on the immediate operating rate of the foundry industry." "We do not believe there would be any noticeable immediate effect." ". . . temporary cut-backs but no serious effect on our economy." "No immediate effect for at least 60 days, then a gradual slowing down to a peacetime level." ". . . not significant one way or another."

These comments are typical of the more optimistic thinking among foundrymen. They see no precipitous drop in operations.

One of those queried thought a truce would ". . . cause an immediate survey and re-shuffling of many of the defense contracts and orders now in production." Another respondent thought the Korean war was "entirely a political affair, kept going . . . to boost production and react to political benefit."

A hurried curtailment in the military program is likely to cause some unemployment, said one executive, "reducing the purchasing power of the public and, as a result, civilian consumption will suffer to some extent, in turn affecting the foundry industry."

Would reversion to a semi-peacetime basis of operation severely disrupt the industry?

Opinion was almost equally divided here. A total of 35.7 per cent thought there would be no disruption of importance to the industry as a whole. Another 35.5 per cent anticipates a temporary decline in foundry operations over a period of 2 or 3 years, but with a definite upsurge to follow. A slight recession in annual volume, with steadying at a somewhat lower level, is the outlook of 28.8 per cent of our poll.

There was almost complete unanimity concerning the continued defense effort. "I firmly believe that the defense effort would not be eliminated, although there might be an approximate 25 per cent reduction on current schedules, which would be spread out over ensuing years." The president of one

large foundry supply companies thought that "the direct defense work in the entire foundry industry is not of sufficient importance to give it too much of a jolt except possibly for the steel foundries."

Another executive felt that ". . . defense will be our largest industry (if you can class defense as an industry) for a long time to come." He is certain that defense as such will continue to be Big Business for many years and will carry the foundry industry along at reasonably good volume.

Because of the necessity to police the world against Communist aggression and to arm the free nations to defend themselves against attack "for the foreseeable era, there can be no reversion to static domestic 'taking in each other's washing.' "

"I don't think reversion to a semi-peacetime operation would severely disrupt the industry now," said a vice-president. "It may have a deflating effect two to three years hence." This delayed reaction was an undertone that ran through several replies. Apparently it was felt that foundries and their associated suppliers would carry on through sheer momentum for a considerable period before the "hang-over" would be experienced.

The foundry, like all the nation's business, is in the middle of an adjustment that is both economic and political in scope. "These factors," said an outstanding and well-known leader in the field, "must be taken into account in reviewing the further effect of a Korean truce. Because the foundry industry is particularly sensitive to these periods of hesitation, it would be my opinion that the immediate effect of a truce would precipitate a hold on the part of American casting buyers and, therefore, a reduction in foundry production and orders." However, this same executive is optimistic about the place of the foundry in the over-all American economic structure.

Another respondent was certain that diversified production and marketing would do most to stabilize the foundry industry. He foresaw no widespread business chaos.

Along the same line, the president of a large west coast foundry spoke out for a "transition . . . to new products, and a reorganization of methods and costs to meet competition."

One opinion was that "the industry has been operating on a semi-peacetime basis for quite some time." This situation would, then, preclude any difficult period of realignment, but it is hardly indicative of the group thinking. The true "semi-peacetime basis" would imply only protective arming, without actual involvement in a shooting war, declared or not.

To bring you this survey, AMERICAN FOUNDRYMAN editors canvassed executives, administrators, and top management in all segments of the industry. Here are some of the men whose opinions are expressed in this report.

H. A. Deane
Vice-President
Campbell, Wyant & Cannon Foundry Co.

P. E. Rentschler
President
Hamilton Foundry & Machine Co.

B. D. Claffey
President
Acme Aluminum Alloys

L. H. Durdin
Vice-President
Dixie Bronze Co.

R. E. Kucher
President
Olympic Foundry Co.

Victor F. Stine
Vice-President
Pangborn Corp.

Vaughan Reid
President
City Pattern Foundry & Machine Co.

L. H. Heyl
General Manager
Federal Foundry Supply Co.

C. B. Tibbetts
President
Los Angeles Steel Casting Co.

H. S. Simpson
Chairman
National Engineering Co.

Edward C. Hoenicke
General Manager Foundry Div.
Eaton Mfg. Co.

C. L. Carter
President
Albion Malleable Iron Co.

William J. Grede
President
Grede Foundries, Inc.

G. E. Seavoy
Vice-President
Whiting Corp.

Newman Ward
President
Electric Steel Foundry Co.

What leaders in the foundry field are thinking . . . .

"Reverting to a semi-peacetime operation will slow down some segments of the industry, but not seriously." That opinion generally represents the answers of those respondents who look for a temporary decline. Their outlook was qualified, however, by the rapidity with which government withdraws from business participation under the new Republican administration. Typically: "I believe that this country is big enough and that there are so many requirements that a basic effort like the foundry industry will always have a market, based on the ups and downs of supply and demand rather than any controls. There is no reason why the foundry industry should be disrupted . . ."

The more pessimistic opinions are typified by this reply: "It is my personal opinion that . . . there will be quite a slow down should peace come about."

A top foundry executive said: "The short range outlook for the foundry industry, through 1953, will be good. Towards the end of 1953 and into 1954, there will be a tightening up but no recession. Instead, good management with realistic planning and efficient operation will forge (sic) ahead while some of the loose or lucky companies will suffer severely." These are words of quiet wisdom that reflect the thinking in all branches of American business and industry.

Assuming a Korean peace, what would be the long-range outlook for the industry?

Whatever the differences on other questions, opinion was strong here regarding the long-range future for the foundry as an industry. A total of 42.7 per cent felt that business over the long haul would be good whether we achieve a formal peace in Korea or not. Another 35.7 per cent thought that some readjustment in a downward direction would be required, but that stability would then be reached. Only 21.6 per cent of the replies predicted a marked slowdown and a strong realignment in the foundry industry on a long-term basis.

General confidence was expressed that the steadily increasing population in this country and the resultant growing market for all types of goods that are produced either directly or indirectly in the foundry would insure relatively high volume. Coupled with this absolute population gain is the constantly increasing standard of living, a factor that is not confined to the United States, but is rapidly finding articulate expression in many heretofore backward regions. Net result: Both Americans and foreigners are going to demand more and more of the hard goods and the machinery to produce them. As we increase our own per capita productivity and the concomitant share in production, we are going to carry along a large segment of the free areas of the world with us in a spiralling level of cultural growth. Will the foundry benefit? Yes, say the men who are doing the guiding and the planning for the industry. Theirs is a wholesome optimism.

"More classes of people want automobiles, radios, refrigerators and modern plumbing." ". . . increase in population, new developments, and the wants of our economy are bound to have a positive effect." "Competition will be keen." "Actually, I believe a Korean peace may benefit the industry from a long-range outlook. New cars, new homes, freer spending should keep the industry healthy."

"Industry has so many new things to manufacture that we believe we will be busy for a long time to come. Research departments have been very busy for a long time and we are not looking for any slowdown whatever for a long while."

"I have every faith in the ability of the free enterprise system to increase the standard of living, not only in our own country, but also in any other area that follows our system of doing things."

". . . our industry will exceed in a few years the tonnage volume we are producing today."

More pessimistic was this answer. "When you consider that peacetime products in the home appliance, automotive and other fields where castings are used are not in short supply, it is my personal opinion that there will be quite a slow down should peace come about."

This general manager was joined by the president of an aluminum alloys supply company. "We believe that branches of the foundry industry would face a serious problem of survival. The difficulty experienced under controlled prices appeared to reflect a surplus foundry capacity at peak demand which could seriously affect the peacetime price structure."

Yet, foundry leaders expressed a genuine confidence in their industry. "If management," said one president, "will concentrate its abilities upon the development of new alloys, improve production techniques . . . and show sufficient ingenuity to meet competition from weldments, fabrication, or other competitive products, we have no reason to feel that our industry is a declining one."

Despite the re-vitalized truce talks in Korea, recent releases from the Commerce Department and the Securities and Exchange Commission reflect a healthy outlook by American businessmen in general. They are planning to spend about $27 billion in 1953 for non-farm plant and equipment, a half-billion increase over last year, and $600 million over 1951. Such figures, although they would undoubtedly be tempered by a formal peace, still show an aggressive outlook and an apparent faith in the new administration's ability to curtail spending and reduce the tax load.

There is a strong current of opinion among those foundrymen polled in our survey about the withdrawal of government from control of industry. A free market based on true supply and demand, without artificial stimulation or confiscatory taxation, is the surest clue to a stabilized industry, they say. ". . . if the fears of industry and the people about rule through governmental administrative controls, instead of the free choice of people in a free enterprise economy, are allayed, we will be assured that the economy will adjust itself without serious damage."

Thus, the foundry industry and all American business await the outcome of Korean truce talks. Foundry executives seem to agree upon the basic soundness of the industry, although soft spots have developed in the production of heavy farm implements and certain other fields. They generally think that a truce would bring some temporary readjustment, but that a formal peace would not have serious and protracted effect on an industry that is almost as old as civilization itself.

The true hope for the future, in their opinion, is the ability of the national economy to absorb the tremendously high productive capacity that has resulted from more than a decade of war stimulation. A constant rise in living standards among a population that is likely to increase for some decades, will provide the market for the goods of the foundry. Long-range prosperity lies in that direction, not in production of armaments.

Castings Council and Non-Ferrous Founders Society Hold Elections

Annual elections of officers were held recently by the National Castings Council and the Non-Ferrous Founders' Society. Results were announced as the 1953 Annual Convention and Foundry Congress of A.F.S. was opening its sessions at the Hotel Sherman in Chicago.

National Castings Council

In an election held at Cleveland on April 29, the National Castings Council elected the following officers: *President*, **Henry J. Trenkamp,** Ohio Foundry Co., Cleveland. Mr. Trenkamp is also president of the Gray Iron Founders' Society. He succeeds H. A. Forsberg, Continental Foundry & Machine Co., East Chicago, Ind., who was also president of the Steel Founders' Society of America. *Vice-President*, **Dr. James T. MacKenzie,** American Cast Iron Pipe Co., Birmingham. Dr. MacKenzie also holds the office of president of the Foundry Educational Foundation. *Treasurer*, **F. Ray Fleig,** Smith Facings & Supply Co., Cleveland. Mr. Fleig was re-elected to this post. He is associated with the Foundry Facing Manufacturers' Association. *Secretary*, **Frank G. Steinbach,** editor, *Foundry*, Cleveland. Mr. Steinbach succeeds himself in an office that he has held for a considerable time.

Comprised of the president and one additional representative from each of foundry associations and societies, the National Castings Council includes the following organizations: American Foundrymen's Society, Foundry Educational Foundation, Foundry Equipment Manufacturers' Association, Foundry Facing Manufacturers' Association, Gray Iron Founders' Society, Malleable Founders' Society, National Foundry Association, Non-Ferrous Founders' Society, and Steel Founders' Society of America.

Non-Ferrous Founders

The Non-Ferrous Founders' Society announced its officers for 1953-54 at the annual dinner of the society, held at the Bismarck Hotel, Chicago, on May 4, as the Annual Convention of A.F.S. was getting under way. The occasion marked the conclusion of ten years of service to the non-ferrous industry by the society, which drew a large group of foundrymen to the Bismarck's Walnut Room to commemorate the anniversary.

Henry J. Trenkamp

James T. MacKenzie

Robert Langsenkamp

H. A. White

Heading the officers is **Robert Langsenkamp,** Langsenkamp-Wheeler Brass Co., Indianapolis, who was elected president. He succeeds L. H. Durdin, Dixie Bronze Co., Inc., Birmingham.

First vice-president for the new term is **H. A. White,** Smeeth-Harwood Co., Chicago, who takes over the post vacated by Mr. Langsenkamp. Second vice-president is **William R. Leopold,** Northern Bronze Corp., Philadelphia. Mr. Leopold's predecessor was Arthur Fischer, Fischer Casting Co., Plainfield, N. J.

James W. Wolfe, Chicago, was re-elected as secretary-treasurer of Non-Ferrous Founders' Society, a position that he has held throughout the ten-year history of the organization.

A.F.S. Apprentice Contest Prize Winners Announced

■ Winners of the 30th American Foundrymen's Society Apprentice Contest were announced following the judging at Chicago's Navy Pier on March 30. Ninety entries were considered in the national contest finals, with 12 prize winners coming from the U. S. and 3 from Canada.

Ten A.F.S. chapters held local apprentice contests prior to the national judging. These chapters were: Birmingham, Detroit, Metropolitan, Michiana, Northeastern Ohio, Northern Illinois-Southern Wisconsin, St. Louis, Southern California, Wisconsin, and Eastern Canada. The Canadian chapter conducted supplementary contests in its Three Rivers and Sherbrooke areas before selecting chapter winners. Northern Illinois (wood), Southern California (non-ferrous), and Detroit (metal), each produced a national first-place winner. Southern Wisconsin took second and third in wood, Southern California a second in non-ferrous, Detroit a third in metal, and Eastern Canada second in steel, and thirds in both steel and non-ferrous. Prize winners are listed below.

First Prize Winners

Gray Iron Molding: William E. Morehead, Caterpillar Tractor Co., Peoria, Ill.; *Steel Molding:* Robert J. Luckenbill, Dodge Steel Co., Philadelphia; *Non-Ferrous Molding:* Joseph LoPatriello, Air-research Mfg. Co., Los Angeles; *Wood Patternmaking:* Richard Sautel, Universal Pattern Works, Rockford, Ill.; *Metal Patternmaking:* George M. Smith, Automotive Pattern Co., Detroit.

Second Prize Winners

Gray Iron Molding: John J. Diaz, Brown & Sharpe Mfg. Co., Providence, R. I.; *Steel Molding:* Marcel Lalonde, Canadian Car & Foundry Co., Ltd., Montreal; *Non-Ferrous Molding:* Carlo Gonzales, Airesearch Mfg. Co., Los Angeles; *Wood Patternmaking:* William Ryerson, Guilford Pattern Works, Rockford, Ill.; *Metal Patternmaking:* Philip D. McDonald, Caterpillar Tractor Co., Peoria, Ill.

Third Prize Winners

Gray Iron Molding: Davey Gambcorta, Olney Foundry Div., Link-Belt Co., Philadelphia; *Steel Molding:* Ghislain Lefrancois, Canadian Car & Foundry Co., Ltd., Montreal; *Non-Ferrous Molding:* Gaston Vigneault, Miller's Brass Foundry, Regd., Three Rivers, Que.; *Wood Patternmaking:* William M. Zimmer, Jr., Arnette Pattern Co., Granite City, Ill.; *Metal*

Joseph LoPatriello
Non-Ferrous Molding

Richard Sautel
Wood Patternmaking

Robert J. Luckenbill
Steel Molding

George M. Smith
Metal Patternmaking

FIRST PRIZE WINNERS

William E. Morehead
Gray Iron Molding

SECOND PRIZE WINNERS

John J. Diaz
Gray Iron Molding

Marcel Lalonde
Steel Molding

Carlo Gonzales
Non-Ferrous Molding

William Ryerson
Wood Patternmaking

Philip D. McDonald
Metal Patternmaking

THIRD PRIZE WINNERS

Davey Gambcorta
Gray Iron Molding

Ghislain Lefrancois
Steel Molding

Gaston Vigneault
Non-Ferrous Molding

William M. Zimmer, Jr.
Wood Patternmaking

Walter Lewandowski
Metal Patternmaking

Patternmaking: Walter Lewandowski, Ford Motor Co., Dearborn, Mich.

Prizes for national contest winners were $100, $50, and $25 for first, second, and third places, respectively. In addition, first prize winners received round-trip transportation to Chicago for the A.F.S. Convention and Foundry Congress.

The prizes for first place winners in the Apprentice Contest were presented to the respective division champions in a ceremony at the 57th Annual Business Meeting of American Foundrymen's Society. This session was part of the 1953 Convention, and was held on Thursday, May 7, at 10 am, in the Grand Ballroom of the Hotel Sherman. National A.F.S. President I. R. Wagner presided, introduced the winners and presented the prizes to LoPatriello, Sautel, Luckenbill, Smith, and Morehead. Importance of the Apprentice Contest is indicated by the fact that the President's annual message and introduction of new national A.F.S. Officers and Directors were also on the program of the meeting.

The A.F.S. National Apprentice Contest Committee, which conducted the competition, is composed of the following men: Chairman, Roy W. Schroeder, Univ. of Illinois, Navy Pier Branch, Chicago; Vice-Chairman, G. E. Garvey, City Pattern & Foundry Co., South Bend, Ind.; Secretary, J. E. Foster, National Headquarters, A.F.S., Chicago; F. W. Burgdorfer, Missouri Pattern Works, St. Louis; Ralph Lightcap, Rupp Pattern Co., Rockford, Ill.; E. J. McAfee, Puget Sound Naval Shipyard, Bremerton, Wash.; V. C. Reid, City Pattern Foundry & Mach. Co., Detroit; G. E. Tait, Dominion Engr. Works, Ltd., Montreal; and J. J. Thompson, Fletcher Works, Inc., Philadelphia.

Judges for the Apprentice Contest were: *Steel:* Edward Gricus, Link-Belt Co., Chicago; A. DiGirolamo, Chicago Steel Foundry Co., Chicago; and Sam Belus, Burnside Steel Foundry Co., Chicago. *Metal Patternmaking:* Joseph J. Schallerer, Calumet Pattern Works, Chicago; H. K. Swanson, Swanson Pattern & Model Works, Chicago; and James Makuta, Mfrs. Brass Foundry Co., Chicago. *Wood Patternmaking:* H. K. Swanson; A. Cervenka, Jr., A. B. C. Pattern & Foundry Co., Chicago; and James Makuta. *Gray Iron Molding:* A. C. Den Breejen, Nichol-Straight Foundry, Chicago; Cornell G. Mate, Greenlee Foundry Co., Cicero, Ill.; Robert Hendry, Love Bros., Inc., Aurora, Ill.; and Joseph M. Arzt, T. L. Arzt Foundry Co., Chicago. *Non-Ferrous Molding:* Fred L. Riddell, H. Kramer & Co., Chicago; Joseph A. Mulvey, Crane Co., Chicago; and Marshall D. King, Hills McCanna Co., Chicago.

A.F.S. National Headquarters and the Apprentice Contest Committee congratulate the prize winners, and the various chapter and plant contest chairmen who contributed to the success of the 1953 Contest. Special acknowledgments are extended to the following firms and individuals for special assistance:

Metal Patternmaking: Aluminum for metal pattern castings supplied by F. W. Burgdorfer, President, Missouri Pattern Works, Inc., St. Louis. The aluminum castings were made by Ace Pattern, St. Louis, from metal supplied by the Missouri Works.

Wood Patternmaking: Model and pattern to prove accuracy of drawing, by E. J. McAfee, Puget Sound Naval Shipyard.

Molding Divisions: Aluminum patterns made by Scientific Cast Products Co., Chicago.

Pattern castings were finished by City Pattern & Foundry Co., South Bend, Ind., through the courtesy of G. E. Garvey, Vice-President. Roy W. Schroeder, Navy Pier, Univ. of Illinois, Chicago, also did valuable work on pattern castings and other phases of the project.

Shipping boxes for the patterns were made by Beardsley & Piper Div., Pettibone and Mulliken Corp., Chicago, courtesy of C. V. Nass.

Convention paper ★

Dry Reclamation of Molding Sand Lowers Cost of Steel Castings

JAMES A. CANNON / *Asst. Superintendent, Duncan Foundry & Machine Works, Inc., Alton, Ill.*

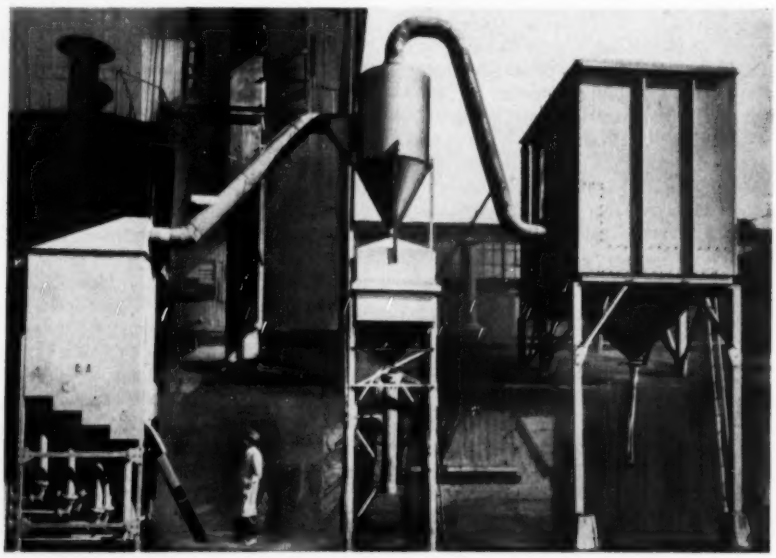
Reclaimed sand produced during an eight-month period with a dry method reclamation unit resulted in decreasing the amount of new sand used by more than 75 per cent. This reclaimed sand was used for facing mixes in molds for steel castings up to 3000 lb. Evaluation of the reclaimed sand is based on a comparison with new sand as used for facing during twelve months preceding the start of sand reclamation. A study of casting defects and casting quality during periods each sand was in use indicates casting quality to be as satisfactory when using reclaimed sand facing as when using new sand facing.

■ A base sand of washed and dried, round-grain Ottawa sand was reclaimed by the dry method in a unit described by C. E. Wenninger at the 1952 A.F.S. Convention ["Pneumatic Reclamation for Foundry Sands," *A.F.S. Transactions*, vol. 60, pp. 330-336 (1952)]. Essentially, this unit is a dry scrubber which removes old clay and fines by agitation and abrasion in an air stream.

Prior to installation of the reclaimer unit, this foundry used new sand in cores and in mold facing sands. With the present reclamation system, new sand is used in cores and reclaimed sand is used in facing for molds. The Ottawa base sand averages 53 A.F.S. grain size with an A.F.S. clay content of about 0.5 per cent. Dry reclaimed sand averages 50 A.F.S. grain size and has an A.F.S. clay content averaging 2.7 per cent. In this report, new sand and reclaimed sand are compared in their abilities to serve as facing sands for steel castings.

This foundry pours acid electric carbon and low alloy steel. Castings range in size from 1 lb to 3000 lb, averaging about 50 lb. Minimum temperature of metal entering the mold is 2850 F (1566 C) with most jobs ranging from 2900 F (1593 C) to 3000 F (1649 C). Small castings are poured from 150-lb shank pots, medium castings are poured from 1000-lb bull ladles, and large

Preprint 53-5. This paper was presented at the Sand Reclamation Symposium of the 57th Annual Meeting, American Foundrymen's Society, Chicago, May 4-8, 1953. All the papers of the symposium will be available as a special publication later this year.



A typical installation (right), showing sand scrubber, fines collector and dust collector. Vibrating conveyor and screen, surge bin, and vibrating feeder complete the sand reclamation system.

castings from 2500-lb and 6000-lb bottom pour ladles.

Only a few experimental cores have been made of reclaimed sand. Because new sand must be introduced into the system, it is introduced at the core room as it happens that the amount of sand consumed by the core room has equalled sand losses from the system and maintained a balance.

The Old and the New

Figure 1 shows a flow diagram of the sand system when new sand was used in facing for molds. New sand entered the system at the core room and at the facing sand mill. Two-thirds of the cores were of new sand and one-third of old sand. New sand was used for facing sand except for small castings where facing was a half and half blend of old and new sand. Old sand amounted to about 20 per cent of the total facing sand used; balance was new sand.

Most core sand went to the cleaning room with castings after shakeout and from there went to the dump. Most molding sand, both facing and back-up, entered the shakeout storage tank. Sufficient sand was removed from storage daily to provide room in the sand system for entry of new sand from the facing mill.

Figure 2 shows the flow diagram for the present dry reclamation sand system. All new sand enters the system at the core room. The core room now uses new sand for all cores. Thus, new sand for the core room as in Fig. 2 is 240 tons instead of 160 tons as in Fig. 1.

New Sand from Cores

After shakeout of castings, new sand in the form of cores enters the cleaning room with castings. This new sand is recovered from the cleaning room and delivered into the shakeout storage tank. There is a small loss of sand from the cleaning room due to contamination by pulverized shot. All facing is now reclaimed sand and there is the advantage of uniformity compared with use of new and blended sands as in the old system. As molds are shaken out, most all facing and back-up sands are delivered into the shakeout storage. Sand in the shakeout storage tank contains 4.0 per cent new sand from cores, 18.0 per cent reclaimed sand from facing sands, and 78.0 per cent old sand from back-up sands.

Sand from the shakeout storage tank is conveyed in sufficient quantity to the reclaimer to maintain sand for mold facing. The balance of sand in the shakeout storage enters the back-up sand mill.

Sand entering the reclaimer has an A.F.S. clay content varying from 5.5 per cent to 8.5 per cent. Fines and clay removal by reclamation represent a reclaimer loss of 12.0 per cent. The reclaimed sand has a clay content of 2.0 per cent to 3.1 per cent averaging 2.7 per cent A.F.S. clay with reclamation rate of 4 tons per hour.

In addition to a 12 per cent loss at the reclaimer, another 6 per cent is lost due to use of sand linings in ladles plus losses of contaminated sands in cleaning room and foundry. The total 18 per cent loss is balanced by new sand introduced at the core room in cores.

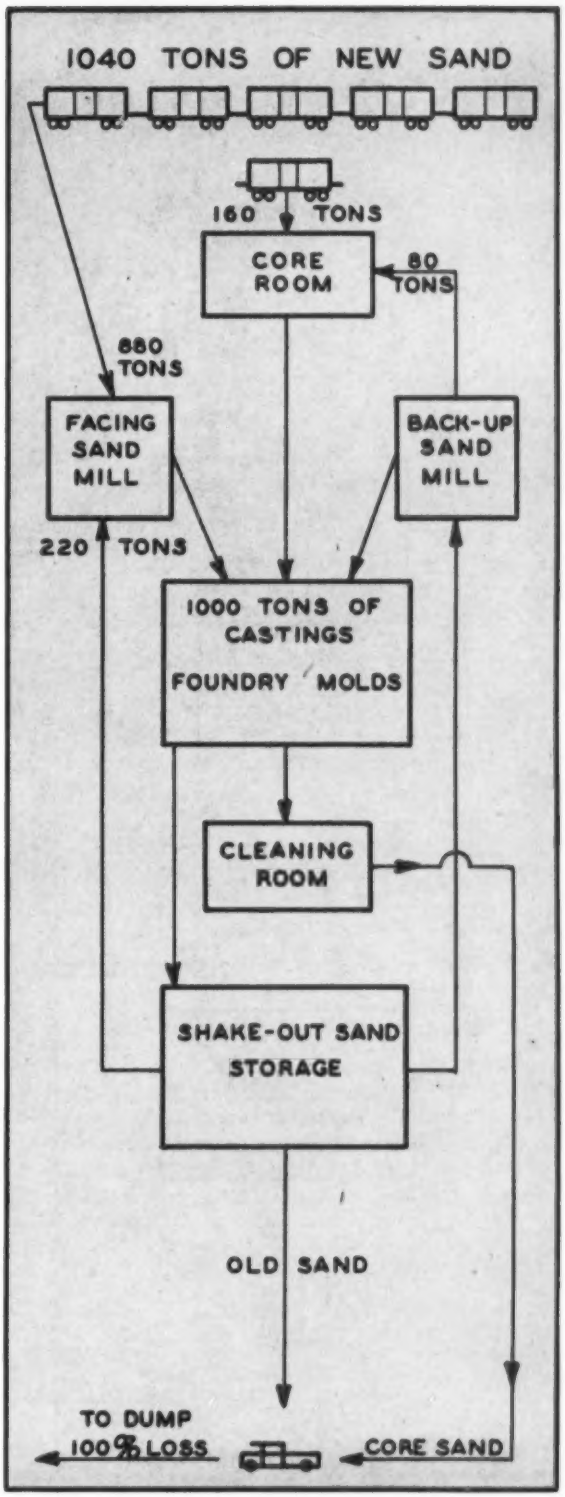


Fig. 1—Original Sand System, showing flow diagram with new sand used for facing molds. Test was made with two-thirds of cores using new sand, balance using the old. New sand entered system at either core room or facing sand mill. Progression through foundry operations is illustrated in the block diagram shown here.

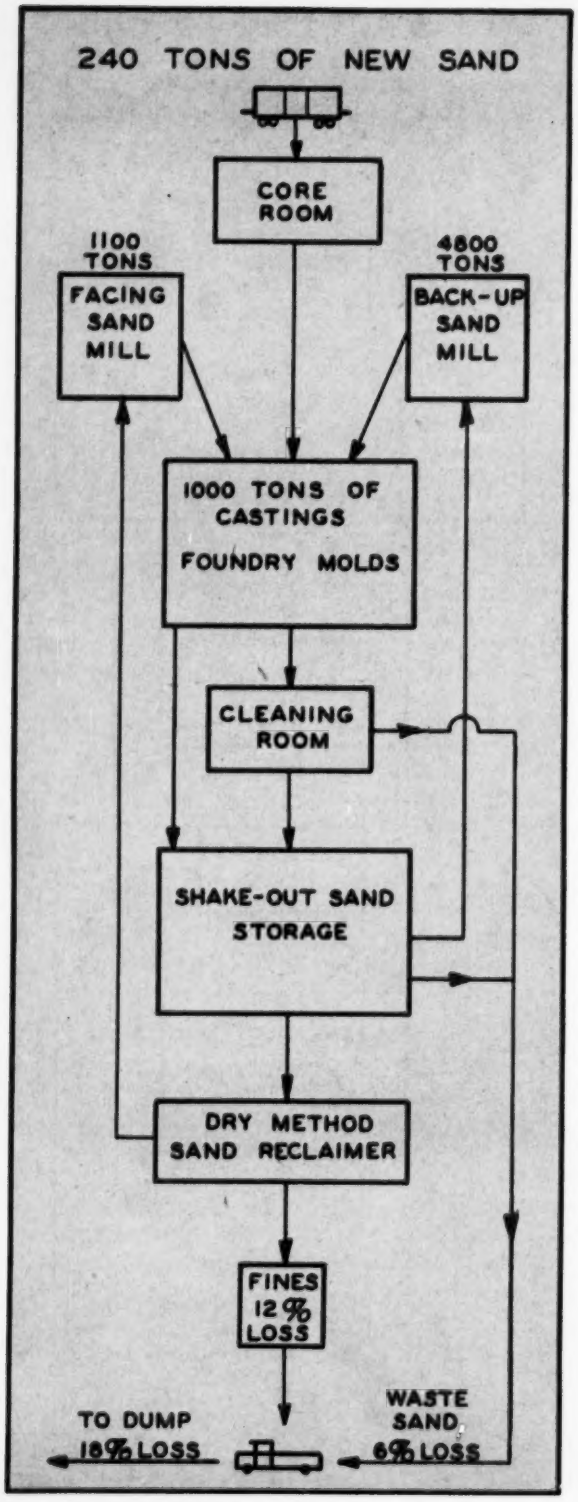


Fig. 2—Dry Reclamation Sand System

Changes in Screen Analysis

During reclamation of sand, daily samples were taken to obtain A.F.S. clay percentage and screen analysis for the reclaimed sand. The same data were obtained from sampling of each car of new sand delivered at the core room. These daily values were plotted and averaged monthly. Figure 3 summarizes and compares screen analysis of new and reclaimed sands for the eight-month period.

The material retained on the 20 and 30 mesh screens for reclaimed sand is not sand, but particles of tile, scale, and sintered sand grains. This foreign material was cause for concern, but has created no trouble as yet. The percentage of sand retained on the 40 and 50 mesh screens is consistently higher with reclaimed sand than with new sand. The percentage of new sand on 70, 100, and 140 mesh screens is consistently higher than reclaimed sand. Both sands have nearly equal amounts on 200 and 270 mesh screens and on pan. The A.F.S. fineness number averages 53 for new sand and 50 for reclaimed sand. The A.F.S. clay content for new sand is 0.5 per cent and A.F.S. clay content of reclaimed sand as shown in Fig. 4 varies by monthly averages from 2.3 per cent to 3.1 per cent. At a reclamation rate of 4 tons reclaimed sand per hour, the A.F.S. clay content averages 2.7 per cent.

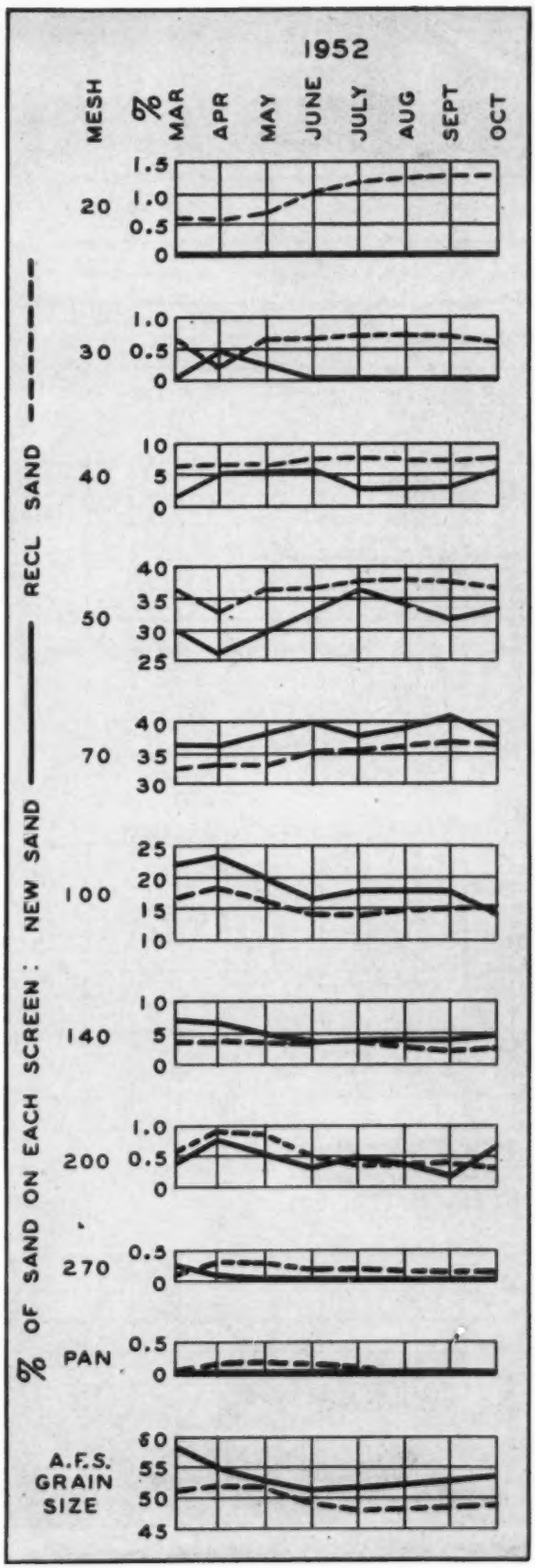
Sand tests taken on each batch of a facing mix for heavy castings were basis for data shown in Fig. 6. This graph summarizes the room temperature properties by showing monthly averages during the eight-month period being discussed. Moisture and green compression were controlled to produce a desirable sand mix. The resulting permeability was closely watched. Though permeability gradually decreased for a period of months, it eventually returned to values equivalent to permeability experienced before reclamation. The drop in permeability cannot be explained, but no ill effect was experienced. Increased green compression during the last three months was an intentional change.

A typical facing mix made of new sand was made with 1 per cent cereal binder and 4 per cent western bentonite. When this mix was made with reclaimed sand the amount of cereal binder was not changed, but due to higher clay content of reclaimed sand, it was necessary to decrease the bentonite addition to 2.3 per cent to obtain equivalent values in green strength and moldability. This decrease in bentonite addition was the only major change in milling practice when converting from new sand to reclaimed sand.

Good Casting Quality Retained

Casting quality as judged by appearance seems the same with new sand or reclaimed sand mold facing. Sand peels easily leaving a clean smooth casting surface with either sand. However, quality can best be evaluated by plotting amounts of scrap castings and amounts of welding rod used for repair. Figure 5 shows monthly average values that make possible comparison between castings made during twelve months of 1951 versus castings made during eight months of 1952.

Average amount of welding rod used to repair defects during reclamation is 68.1 per cent of welding rod used before reclamation. Average amount of total scrap during reclamation period is 85.4 per cent of total scrap made before reclamation. When considering only that portion of scrap attributed to sand de-



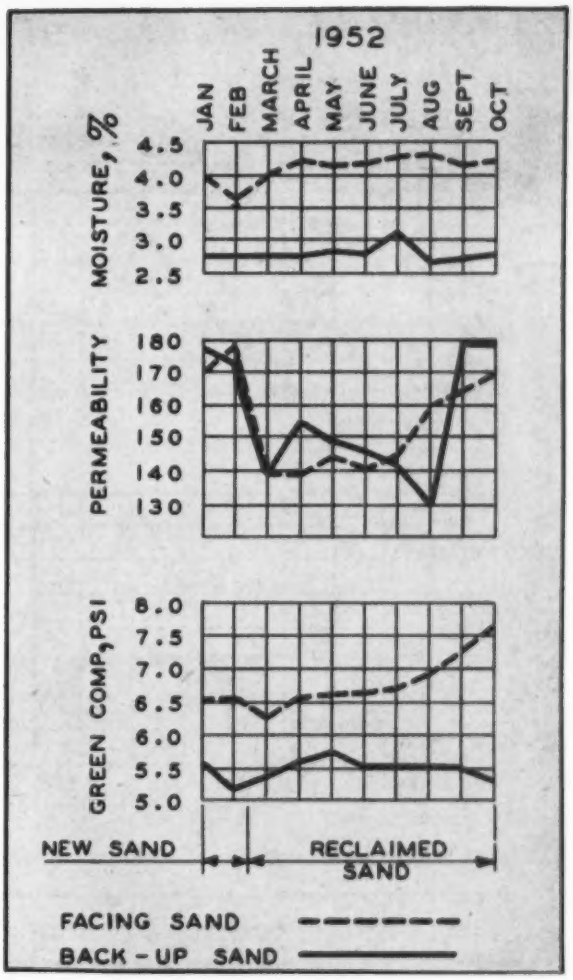


Fig. 4—Room Temperature Properties

fects such as sand, blows and scabs, the amount of scrap during the reclamation is 81.7 per cent of the same class of scrap made before the reclamation period. Finally, scrap due only to sand erosion is compared for the two periods and scrap due to sand is practically the same when using either new sand or reclaimed sand for mold facing.

It is not to be assumed that the decrease in total scrap and decrease in welding rod used during the reclamation period is due to the sand only. This improvement must be the result of improved foundry techniques as well as the sand. It can be safely assumed, however, that quality of castings has not decreased due to use of reclaimed sand for mold facing.

The use of reclaimed sand as a facing sand in molds for steel castings has presented no objectionable problem in the sand system, the reclaiming operation, in milling or in molding. The use of reclaimed sand has decreased new sand consumption by more than 75 per cent. The reclaiming operation not only provides a more uniform sand for facing, but renews the entire

Fig. 3 (left)—Screen Analysis

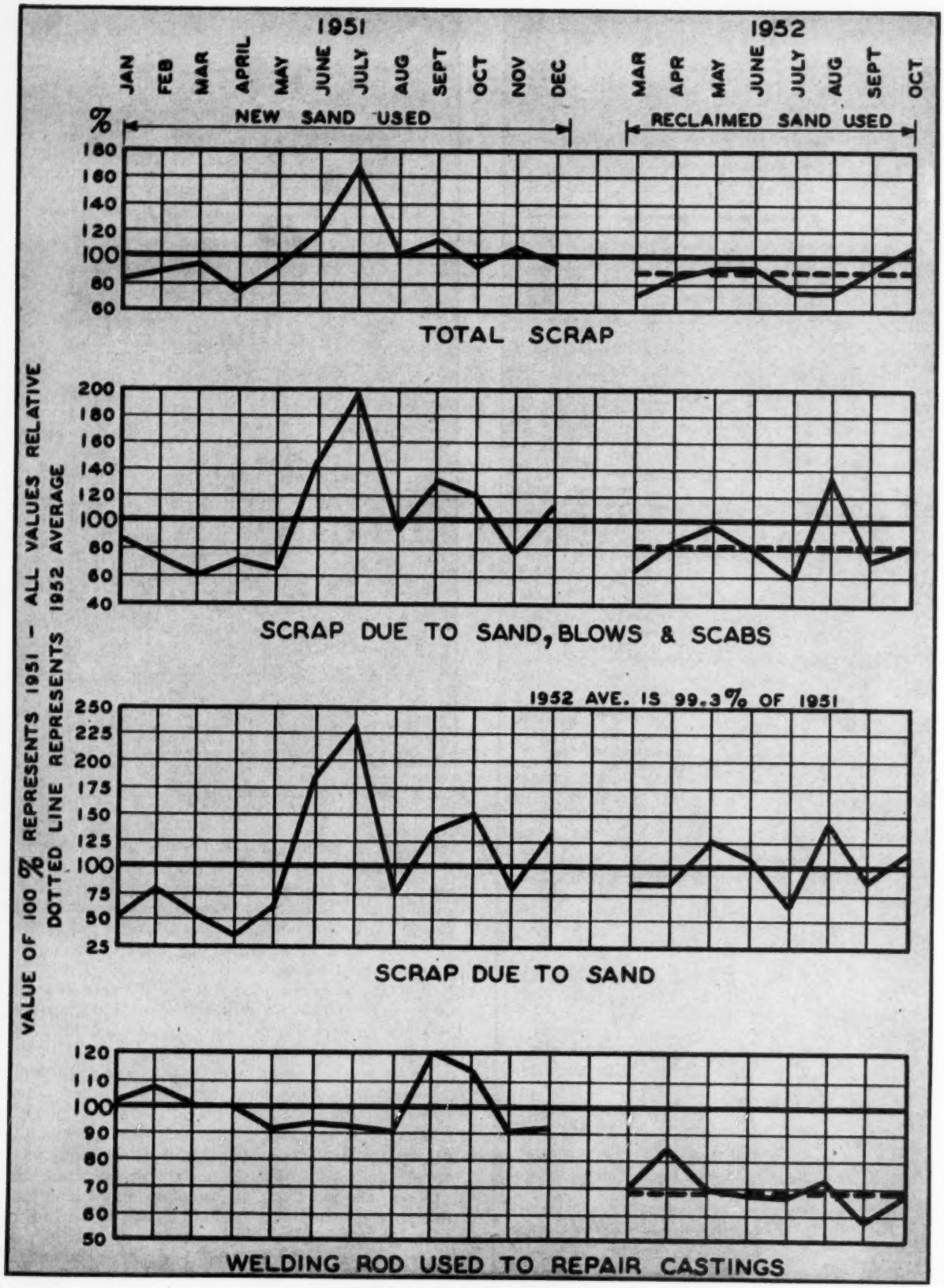


Fig. 5—Scrap and Repair

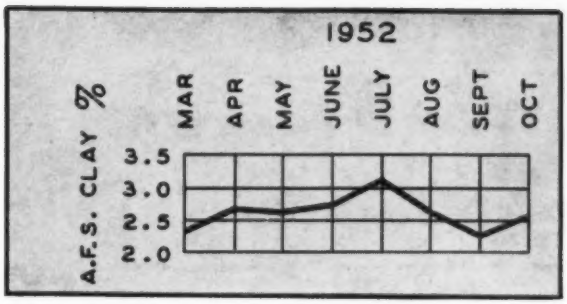


Fig. 6.—Clay Content of Reclaimed Sand

sand system every eight to ten days and provides uniform sand for back-up sand as well.

Although the above-mentioned advantages for dry reclaimed sand are desirable, the final test is in the end result. How good are the castings? A poorer sand will result in more scrap and more repair of castings. During the reclamation period being discussed there has been less scrap and less casting repair than formerly. Thus it can be concluded that dry-reclaimed sand is as satisfactory as new sand for use as a facing sand in molds for steel castings up to 3000 lb in weight.

Acknowledgements

The writer wishes to express appreciation to those persons offering the opportunity to present this paper and for permission to use the information obtained and also for the help in securing data and advice in preparing the manuscript. Thanks are extended especially to S. W. Duncan of Duncan Foundry & Machine Works, Inc., W. C. Carroll, superintendent, R. Corwin, metallurgist, and J. B. Caine, consultant.

Calendar of Future Meetings and Exhibits

May

18-22. . Material Handling Institute
Convention Hall, Philadelphia. 5th national materials handling exposition.

20-22. . Society for Experimental Stress Analysis
Hotel Schroeder, Milwaukee. Spring Meeting.

22. . Malleable Founders' Society
Drake Hotel, Chicago. Western sectional meeting.

June

8-10. . Malleable Founders' Society
Homestead, Hot Springs, Va. Annual meeting.

15-19. . Int'l. Materials Exposition
Grand Central Palace, New York. Exposition of basic materials for industry.

16-19. . Institute of British Foundrymen
Winter Gardens, Blackpool, England. 50th Annual Conference.

16-19. . American Welding Society
Shamrock Hotel, Houston, Tex. Exposition and national spring technical meeting.

29-July 3. . American Society for Testing Materials
Chalfonte-Haddon Hall, Atlantic City, N. J. Annual Meeting.

July

24. . Malleable Founders' Society
Drake Hotel, Chicago. Western sectional meeting.

August

10-19. . Advanced Cast Metals Practice
University of Michigan, Ann Arbor, Mich.

September

17-18. . National Foundry Association
Plaza Hotel, New York. Annual meeting.

17-18. . Niagara Frontier Regional Conference
Statler Hotel, Buffalo.

19-26. . International Foundry Congress
Paris, France. Host: Association Technique de Fonderie de France.

21-22. . Steel Founders' Society
Homestead, Hot Springs, Va. Fall meeting.

21-25. . Instrument Society of America
Sherman Hotel, Chicago. National Congress & Exhibit.

24-25. . Ohio Regional Foundry Conference
Netherlands Plaza, Cincinnati. Sponsored by A.F.S. Cincinnati, Northeastern Ohio, Central Ohio, Canton, and Toledo Chapters.

25. . Malleable Founders' Society
Annual meeting.

October

8-9. . Michigan Regional Conference
Michigan State College, East Lansing, Mich. Sponsored by A.F.S. Central Michigan, Western Michigan, Detroit and Saginaw Valley Chapters and Michigan State and University of Michigan Student Chapters.

8-9. . Gray Iron Founders' Society
New Hotel Jefferson, St. Louis. Annual meeting.

9-15. . 5th International Congress of Mechanical Manufacture
Turin, Italy. Production methods and parts assembly.

15-17. . Foundry Equipment Manufacturers' Association
Greenbrier, White Sulphur Springs, W. Va. Annual meeting.

16-17. . Northwest Regional Conference
University of Washington and New Washington Hotel, Seattle. Sponsored by Washington, Oregon, and British Columbia Chapters, and University of Oregon Student Chapter.

19-23. . 35th Nat'l Metal Exposition & Congress
Cleveland Public Auditorium, Cleveland.

29-30. . Metals Casting Conference
Purdue University, West Lafayette, Ind. Sponsored by Central Indiana and Michiana Chapters, Purdue University, and the Purdue Student Chapter.

November

4-6. . Steel Founders' Society
T & O Conference.

Convention paper ★

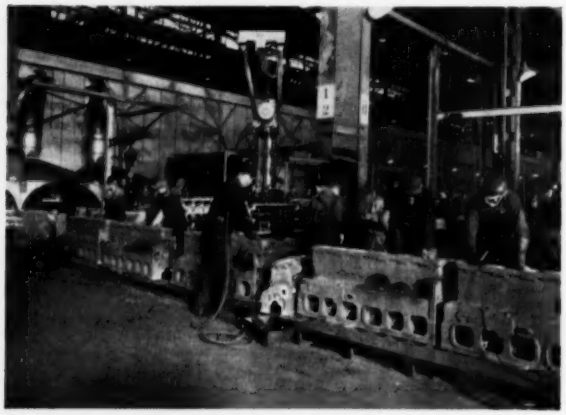
Positive Safety Program Reduces Foundry Accidents

F. W. Shipley / *Foundry Mgr., Caterpillar Tractor Co., Peoria, Ill.*

Everyone is familiar with the phrase "The Safe Way Is the Best Way." By just changing one word in that phrase, foundrymen will be well on their way to a manner of thinking that is absolutely necessary if accidents are to be prevented. The change is: "The Safe Way Is the *Only* Way."

■ If we who are interested in the welfare of our people really assume the responsibility which is ours as managers, there can be little doubt but that accidents can be very greatly reduced.

The experience of a great number of companies including our own over the past ten years or so, shows



Use of safety goggles is primary protection for these workers, who are chipping and grinding diesel blocks. Accidents can reach an alarming rate in this type of operation unless adequate precautions become daily procedure.

that industrial accidents can be reduced. The records prove without question that there are positive benefits to be gained. However, in order to attain a worthwhile program of safe practices it is absolutely essential that a *real desire* for a reduction of accidents be present. It is not enough to give lip service alone to the idea of a safety program because accidents cannot be prevented by putting up signs to the effect that tomorrow we start a safety program and therefore we do not expect any more accidents from that day on. We must believe it, really want it, and think about it twenty four hours a day.

Preprint 53-73. This paper was presented at a Safety & Hygiene & Air Pollution Session of the 57th Annual Meeting, American Foundrymen's Society, Chicago, May 4-8, 1953.

Safety Comes First

To set up a program for safety that really works we must first start with the premise that "Safety Is Actually The Most Important Thing We Have To Do." It must come ahead of everything else, yes, even production. This was brought out forcefully in our own company just recently by our president, L. B. Neumiller. While discussing the problems ahead for the coming year, at a Management Meeting attended by all supervision, he said, "The most important job for all of us in the year ahead is safety," and judging from the safety record of the company over a long period of time you know full well that he meant it.

Outline of a Safety Program

Perhaps the best way to outline a safety program is to describe some steps we have taken and enumerate the results. Approximately 20 years ago when our accident rate was far from good we set up a system whereby each accident, regardless of severity, was recorded on a First Aid IBM card. On the front of this card the injury is described from a medical standpoint. On the back, space is provided for the foreman to describe in detail the *how, when and why* of the accident. The records from these cards are compiled by the Safety Division which issues monthly reports by departments.

Off-shift monthly safety meetings attended by all levels of supervision are held around the clock. Arrangements are made for a different supervisor to lead each monthly meeting of his own shift. This means that three different supervisors would lead safety meetings each month. This fact alone helps further the safety program because one cannot help but be more safety conscious after having led one of the meetings. At these safety meetings lost time cases are discussed in detail with special emphasis on ways of preventing recurrences. Even minor accidents are also discussed for it is realized that given a right set of circumstances

Hand truck accidents dropped 30 per cent since safety training program was inaugurated a year ago.

these incidents, too, could have been lost time cases.

A committee of supervisors was also set up to inspect the shop daily for cleanliness and orderliness. The men on this committee inspect other departments than their own and make their reports individually at the regular monthly safety meetings. We have always felt that cleanliness and orderliness contribute greatly to accident prevention and that generally speaking, a clean shop is a safe shop. In addition to the monthly safety meetings, a committee of three supervisors (a different group each month) meets each day to thoroughly investigate the First Aid cases from the previous day and make recommendations to prevent recurrences.

In connection with this whole program everyone is encouraged to go to the First Aid Station for even the most minor cut or scratch and supervisors are criticized if their people do not visit First Aid when they are injured. These investigations are simply another method of checking on the supervisor as a follow up on the manner in which the foreman had investigated the accident and what he had done to prevent further accidents of this kind. All this was designed as another step in a never ending campaign of education to make everyone, supervisors and all, conscious of accident prevention.

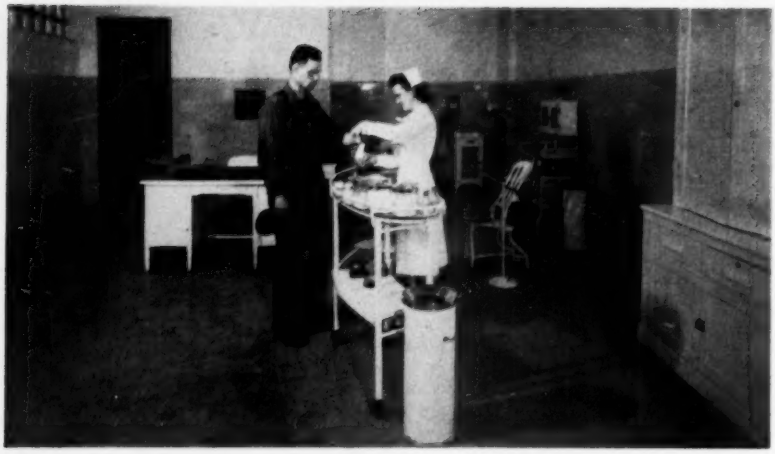
Protective Equipment is Essential

Safety glasses are furnished free of charge and if prescription lenses are necessary the company pays half the original cost. In the foundry the wearing of safety glasses was made a condition of employment. When this program was first introduced, it was difficult to get everyone to accept it, but now it is accepted readily by all. In fact, everyone is so conscious of it that anyone, even visitors, walking into the foundry without safety glasses will be stopped by someone before he progresses very far into the building.

All iron pourers, cupola operators, grinders and chippers wear safety goggles which fit tightly against the face. These too, are furnished free of charge. Another vital part of the whole eye protection program is regular inspection and replacement of defective lenses, frames, etc. A qualified employee of the Safety Division makes periodic visits through all departments with his "goggle cart." He is equipped to examine all goggles and glasses and replace on the spot any defective parts which he finds. This program insures against the possibility of anyone not wearing glasses or goggles because they have become defective. There just isn't any excuse for not wearing eye protection when it is kept readily available and maintained in A-1 condition. As a result of this program eye injuries in the foundry are kept at a minimum.

Another step in the prevention of accidents is the protection of the feet. All employees are encouraged to wear safety shoes. As part of this program the Safety Division maintains a large stock of safety shoes which are sold to employees at cost. On this basis he is able to buy safety shoes at lower costs, generally, than other shoes so there is little sales resistance against the wearing of safety shoes. A concentrated sales program on safety shoes is given to the new employee who is entering the plant for the first time. As a result these new employees will be found to be practically 100 per cent equipped with safety shoes. In connection with this same program of foot protection, aluminum slip-over foot guards are furnished to those employees whose occupations are most hazardous in this respect.

In the foundry all iron pourers must wear Congress shoes with good substantial soles. Olive drab wool pants faced with chrome leather are also furnished these people. These are dry cleaned once a week and returned to the employee without charge. In addition, the iron pourer is required to wear chrome leather spats or leggings over his shoes and underneath the pants leg. We have found this method much more successful than wearing leggings on the outside be-



Any safety program must include adequate first aid facilities, staffed with competent personnel, in order to minimize accidents that do occur.

cause splashed iron will not collect in the folds of the trousers and burn through to the body. As a result of these precautions we have reduced incidence of body burns among the iron pourers to a point where they are almost negligible.

License Motive Power Operators

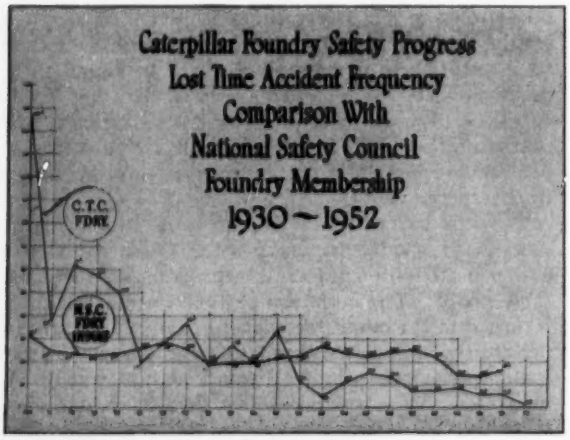
Another vital step for prevention of accidents was the establishment of a training and licensing program for all power truckers, tractor drivers, overhead crane operators, and drivers of mobile equipment. No person is allowed to operate any of the above equipment without a license. This license, in the form of a special badge, must be worn at all times while operating the equipment. Special instructors under the supervision of the Training Department are in charge of this program. Candidates for training, selected by the supervisor, are screened by the Medical Department for physical soundness with special emphasis on eyes (including depth of perception as well as good vision), reaction time, and emotional stability.

The trainee is taught the care of the equipment as well as the safe way to operate the particular machine for which he is to be licensed. At the conclusion of the course he is given an actual driving test under the watchful eye of the instructor at which time he is either passed or rejected. In our experience approximately 78 per cent of the people who have been considered for these jobs have passed the tests and have been licensed. Of those who were not licensed, most were rejected because of poor eyesight, carelessness, or emotional instability.

What our experience might have been if the 22 per cent who were rejected had been allowed to operate we do not know, but we do have proof positive that accidents of this category have been very materially reduced since the training program was inaugurated.

The responsibility for the safe operation of this type of equipment does not end, however, when the license is issued. These operators are constantly observed by the foreman and if one should become careless he is warned by the supervisor. If, after this warning, he continues to operate carelessly, he is taken off the job and his license revoked. Relief or extra operators are trained and licensed to take the place of the regular operator in case of absenteeism, but it is stipulated that the relief operator must operate the equipment at least one day per month or he is to be given a refresher course before he is allowed to operate again.

Although operators of battery powered hand trucks are not licensed they are trained by the foreman on the job and given a booklet concerning the operation of this equipment. This booklet describes by illustrated cartoons the safe way to operate the truck and also shows what might happen if it is not operated properly. All accidents relative to these hand trucks either directly or indirectly, have dropped 30 per cent since this program was inaugurated about a year ago.



Mechanics of Safety Program

Approximately 10 years ago Union Safety Meetings were set up. In the foundry there is one safety committeeman for each general foreman. These safety committeemen meet once a month with the general foremen of the foundry and discuss various safety problems. The chairman of the Union Safety Committee then meets once a month with the safety director and his staff to discuss overall plant safety problems. This program, too, has helped make everyone more safety conscious and thus it becomes a vital part of safety education. These monthly meetings with the general foremen and the Union Safety Committee are in addition to the Supervisory Monthly

Safety Meetings which have been described before.

The Safety Division has also set up a staff of safety inspectors operating on all shifts whose duty is to be constantly on the lookout for unsafe practices. Whenever they observe anything unsafe, they report it immediately to the supervisor of the department and also make out a report to the safety manager who in turn calls it to the attention of the factory manager.

To a man who has been injured, or to his family who are losing his income as a result of an accident, an outstanding record of plant safety does not mean a thing. He only thinks of his own misfortune and the real hardship which confronts him at that time. For this reason we have always had uppermost in our minds the reduction of injuries to our employees and not the establishment of an outstanding record. Records in themselves do not prevent accidents but only tell us where we have been and where we are going.

How Record Stacks Up

Here a comparison is made between our lost time accident record and that of the National Safety Council for the foundry industry in general (see chart at bottom of page 76). In 1952 while working 2,968,025 man hours we had four lost time cases among approximately 1,700 employees.

Case No. 1: A sandslinger helper slipped while he and another employee were rolling over the drag half of a mold (pop-off flask) which weighed approximately 100 lb. Another employee who was working with him did not notice that he had slipped. Injured employee did not report to First Aid or to foreman until two days later. His back was injured and he lost ten days time.

Case No. 2: A swing grinder was grinding an axle housing. He had previously ground three of these castings and had placed them on a pile behind him. While grinding next casting he inadvertantly braced his foot against the pile of ground castings. The top casting slipped off because it had not been placed properly. It fell to the floor and rolled on his foot. Casting weighed approximately 300 lb and fell about one foot onto employee's foot striking back of steel toe of his safety shoes. Employee lost six weeks time.

Case No. 3: Shot blast operator was hanging casting on blast conveyor chain. An exhaust manifold, approximately 6 ft long and weighing 150 lb slipped loose at one end, fell to the floor and struck his foot. He was using the wrong kind of hooks. The foreman noticed it but the accident happened before he could reach the man and stop him. Employee lost six weeks time.

Case No. 4: A wood patternmaker noticed an irritation in right eye. He did not know the specific source of the small piece of steel found in his eye, nor did he recall an instance which could have caused the injury. He works about ten feet from a wood sander which might have been the source but no one knows. He did not report to First Aid until approximately four hours after he noticed irritation. Man lost seven days.

All of these accidents, except possibly case No. 4, would not have happened if the people had been thinking and had used the safe practice which they had been taught. The significant point here is that safety instruction alone is not enough. It is necessary to constantly be on the lookout for unsafe practices and call them to the attention of the people continuously.

Safety Summed Up

Safety is more of a state of mind than an array of protective guards over a machine.

Elimination of accidents is a long time proposition. It cannot be accomplished in a month or even a year.

Safety is a never-ending program of education and constant effort. We must be alert and stop unsafe practices on the spot. Don't wait to write a report about it after an accident occurs. Many times in the past we might have been justifiably discouraged for our results seemed to indicate little progress. However, the results on the graph indicate that our efforts of long age were not in vain and eventually proved worthwhile.

Handling of molten metal presents continuous problem of protection for foundry shop workers.

Safety equipment must be provided and used.

"The Safe Way Is the Only Way."

"Safety is the most important job we have every day."

Any program of safe practices is no better than the *desire to make it real.*

Accidents can and must be prevented.

LIBRARY In Iron

Fischer's unique Foundation typifies Europe's progressive foundry industry, which hosts the International Foundry Congress in Paris, Sept. 19-26.

WORKING on the premise that the foundation of specialized libraries dealing with single aspects of science is essential if the history of technology is to be preserved, George Fischer, Ltd., of Schaffhausen, Switzerland, recently established the Iron Library in the nearby buildings of the former Paradise Convent.

This venerable metal-working firm, despite its 150-year history, is one of the most progressive organizations in Europe. The Iron Library Foundation is intended to preserve for future generations literature relating to the development of iron, and to the achievements of scientists, technicians and industrialists who have worked with the metal through the centuries. It is designed to create a sanctuary for the iron literature of every country and every age.

Johann Conrad Fischer, founder of the firm in 1802, enjoyed a brilliant reputation because of his research in steel and alloys, and his expanding industrial activities. A strong impulse toward universality animated Fischer throughout his life, and this aspect of his personality is reflected in the Iron Library, which is international in scope.

In 1918 the Fischer firm purchased the spectacularly beautiful Paradise Convent Estate, but it was not decided to use the property for a library until the present management established the Foundation in 1948. Extensive renovations began in 1949, with one wing being converted for use as a library. The present library rooms can house some 40,000 books. A separate section has been prepared as a reading room and for use by the librarian.

In this quiet and sequestered place, between the Lake of Constance and the Rhine Falls, amidst some of the loveliest river scenery in Europe, the Iron Library honors the achievements of the iron industry, of the smiths, founders, miners, technicians and iron

masters of the past who have contributed so significantly to the development of one of the most important elements in our culture.

At present, the Iron Library possesses about 10,000 volumes, including many standard works of iron literature dating from the 16th to the 19th centuries, a large number of lesser-known monographs and academic writings, and government decrees relating to the iron industry and mining. Apart from books on pure science and political economy, and volumes devoted to the history of iron and iron works, suitable provision has been made for literature relating to various auxiliary sciences and allied subjects. The most important related subjects represented are mining and the study of ores. This literature comprises selected books on geology and mineralogy, including assaying.

Early books on pure science have been chosen primarily because literature on the industrial arts published in earlier centuries was usually indistinguishable from scientific treatises. Science and the early industrial arts developed together and were mutually interdependent.

Historical background

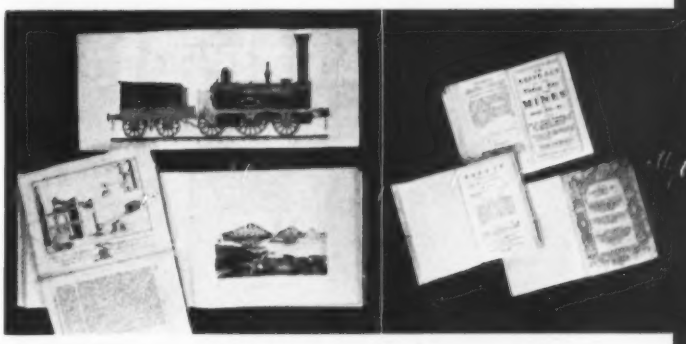
Works on prehistory and the history of metals, books on meteors, early works on applied mechanics and machines, and literature on weapons and artistic wrought-iron, cast-iron and locksmith's work provide the Iron Library with an appropriate background of cultural history. After careful selection to insure that the ground was not already covered in the specific literature on the utilization of iron, books on iron construction—bridges, ship building, hydraulic engineering and building—have been included and form a necessary framework of knowledge within the field. Space has also been allotted to old mining law, which is closely connected with the history of metallurgy.

Old travel books have sometimes proved to be valuable sources of information for the history of iron, and often for its technology. They are a supplement to the metallurgical travel books contained in the Iron Library.

continued on page 104

British 19th century iron literature is well represented in the Library (left) by Spretson, Bauerman and Kirkaldy. The rare books of Agricola, printed in Basle about 1530, are among the valuable Schaffhausen treasures (right).

Conrad Gesner wrote the treatise at left, which appeared in Switzerland in 1565. It is important in Swiss iron literature. Robert Boyle, noted British scientist, has many works in the collection, as illustrated at right above.



These volumes are typical of the rare English manuscripts found in the collection. Stephenson's first locomotive, the Rocket, is illustrated at left, together with early pump and bridge construction. At right are various treatises on mining contained in the Iron Library Schaffhausen collection.

TENTATIVE PROGRAM

1953 International Foundry Congress
Paris, France

Headquarters and all Technical Sessions—In building of Syndicat General des Fondeurs de France, 2 Rue de Bassano, Paris.

SATURDAY, SEPTEMBER 19

P.M.—Reception of participants and families by French Foundry Association.

SUNDAY, SEPTEMBER 20

Trip for everyone in Province l'Ile de France. Lunch in the open.

MONDAY, SEPTEMBER 21

A.M.—Combined session, opening of Congress in Grand Amphitheater of the Sorbonne (University of Paris, one of the oldest in the world).

P.M.—Technical meetings (three simultaneously), followed by official reception by the City Council of Paris.

Evening—Theater.

continued on page 147

Convention paper ★

Research in Pattern Coating

Produces Quality Castings

CHARLES J. BERG / *Industrial Project Chemist, Sherwin-Williams Lacquer Laboratory, Chicago*

Checking surface finish of patterns is an important step in producing quality castings, whether they be street car crossings (above) or smaller production units.

Types of coatings commonly used as pattern coatings are briefly reviewed and various data are presented comparing the package, application and dry film characteristics of shellac, crankcase sealer and seven other pattern coatings. These data are discussed and the shortcomings and virtues of the different coatings are pointed out. Cost factors are considered and the inherent economies of higher solids coatings are stressed. Application techniques and shop conditions are discussed and several suggestions concerning these problems are offered.

■ Even before a pattern is made, much thought and effort go into its design and layout. The best woods are carefully selected with cost a secondary objective. A pattern is then made from these woods by highly skilled men with years of training and experience. The result is a product of great precision and high value.

Since the pattern represents a sizable investment, the selection of an organic coating to protect this product merits some consideration. A coating can be selected that has been carefully formulated for this specific end use, one that will conform to the exacting standards set up for the pattern itself. It is also possible to select an inferior coating, one that offers no practical protection at all.

Today, shellac is commonly used as a pattern coating and it has been used for this purpose for a good many years. Shellac unquestionably has some merits or it wouldn't continue to be popular. However, through years of development and research many advances have been made in organic coatings which have relegated shellac to a position of inferiority by comparison. There are many types of coatings available that meet the demands of a pattern coating much more fully.

Crankcase sealer is also used as a pattern coating. Actually crankcase sealer is a good organic coating for finishing crankcases, but not necessarily for protecting patterns. As its name implies, it has been formulated for a specific end use. This type of product has some virtues, among them initial low cost per unit of volume. However, in the final analysis, crankcase sealer

Preprint 53-72. This paper was presented at a Pattern Session of the 57th Annual Meeting, American Foundrymen's Society, Chicago, May 4-8, 1953.

TABLE 1—PACKAGE AND APPLICATION CHARACTERISTICS

Pattern Coating	Build[1]	Total Solids	Brushability	Drying[2] Time	Drying[3] Time Over Wax	Gloss[4]	General Appearance	Odor
Shellac	0.8	35.0	7	60 min	Same	68	4	9
Crankcase Sealer	0.3	25.0	6	15 min	Same	27	6	6
A	2.5	47.0	10	30 min	Same	93	10	9
B	1.0	33.0	8	30 min	Same	60	7	7
C	1.3	37.0	9	40 min	Same	53	8	6
D	1.0	42.0	6	10 min	Same	26	5	6
E	2.0	54.0	9	30 min	Slower	78	9	5
F	0.8	43.0	7	24 hr	Much Slower	76	6	8
G	0.7	41.0	7	15 min	Same	62	7	7

1. Build expressed in thousandths of an inch obtained from one coat applied by brush.
2. Drying to handle at room temperature, approximately 70 F.
3. Equivalent to drying over wood or slower.
4. Gloss reading obtained on wood using Gardner Gloss Meter. A gloss of 100 is equivalent to a mirror surface and a gloss of 0 is equivalent to a perfect lustreless surface.

will cost just as much, if not more, than a coating formulated specifically for the protection of patterns and it does not provide the maximum protection available.

Several unfavorable comments have now been made regarding shellac and crankcase sealer. One of the purposes of this paper is to present factual data showing why and how these, and other protective coatings, are unsuited for use as pattern coatings. The data contained in this paper were obtained from a series of tests conducted on a representative cross section of pattern coatings now available. Just because a paint can has a label stating that it is a pattern coating is no guarantee that it is good for this purpose.

It will be seen that among the coatings being represented as specifically designed for use on patterns, some are quite obviously better than others. The series of tests referred to above, was correlated as closely as possible to the actual conditions that a pattern is subjected to in use. It is hoped that the results of these tests, as presented in this paper, will help the patternmaker differentiate between the good and the bad and aid in the selection of a pattern coating that offers the maximum in protection and quality.

Background of Research on Pattern Coatings

The paint industry has the knowledge and experience to formulate various protective coatings, but before any coating can be properly formulated the user must be consulted concerning the special properties desired. For this reason the patternmaker and foundryman were consulted before good pattern coatings could be developed. It was found that past experience could be relied upon to provide many of the properties desired by the users of pattern coatings. However, some of the properties desired were unique and considerable research was required before such properties were successfully incorporated into a pattern coating.

Before presenting the results of the tests that were conducted, a brief discussion concerning the various basic film formers used in pattern coatings is in order. Previously shellac and crankcase sealer have been mentioned. Shellac is a type of coating itself, being a natural resin of animal origin. It is fairly expensive, soluble in alcohol, and releases its solvent slowly.

Crankcase sealer falls within a group that is known as nitrocellulose lacquers. This type of coating is the most widely used for the protection of patterns. It is interesting to note that cellulose lacquers, when properly formulated, are among the best pattern coatings, even though crankcase sealer falls within this classification. Since nitrocellulose lacquers are so widely used as pattern coatings several of them have been included in the evaluation.

Some varnishes and enamels are also used as pattern coatings, but because of the long drying times of this type of finish they are generally considered to be unsuited for this use. However, one pattern coating employing this type of basic film former has been included in the evaluation. Other types of pattern coatings have rubber or a rubber derivative as the basic film former and it was felt this type of coating was worthy of consideration in the evaluation. A close cousin of nitrocellulose, ethyl cellulose has been used in pattern coatings and one such product has also been evaluated through the series of tests.

Vinyl coatings have recently received considerable publicity. Vinyls do have very good abrasion and chemical resistance. However, it is generally conceded that vinyls have very poor adhesion to wood unless an undercoat is employed. The solvents used in vinyl coatings also have strong unpleasant odors. A sample of a vinyl pattern coating was not available for this

TABLE 2—DRY FILM CHARACTERISTICS

Pattern Coating	Pencil Hardness	Flexibility	Abrasion[2] Resistance Mg Lost in 500 cyc.	120 F Print Resistance	Uncured Core Sand Resistance	Water Soluble Core Binder Resistance	Gasoline Resistance	Water Penetration % Water Absorbed 24 Hr	Water Penetration % Water Absorbed 120 Hr
Shellac	HB	⅛ in.	66	V. Poor Bad Print	V. Poor Sticking & Softening	V. Poor Softening & Sticking	Good Sl. Softening	3.1	8.6
Crankcase Sealer	1H	1 in.	45	Excellent No effect	Excellent No effect	Poor Softening & Sticking	Fair Softening	1.2	4.0
A	3H	¼ in.	35	Excellent No effect	Excellent No effect	Excellent No effect	Excellent No effect	0.88	2.9
B	1H	⅛ in.	40	Fair Sl. Print	Good Sl. Stick.	Poor Softening & Sticking	Good Sl. Softening	1.82	7.6
C	F	1 in.	47	Good V. Slight Print	Excellent No effect	Poor Softening & Sticking	Fair Softening	0.85	2.8
D	1H	3 in.	70	Excellent No effect	Excellent No effect	Excellent No effect	Excellent No effect	5.1	Coating Cracked and Peeled
E	1H	1 in.	67	Poor Print	Poor Sticking & Softening	Fair Softening	Excellent No effect	0.34	1.5
F	HB	⅛ in.	30	Fair Sl. Print	Excellent No effect	Poor Sticking & Softening	Fair Softening	1.98	6.2
G	2B	6 in.	67	Poor Print	Poor Sticking & Softening	Fair Softening	Good Sl. Softening	0.75	2.5

1. Diameter bend at which cracking occurs.
2. 500 cycles on Taber Abraser.
3. Mahogany blocks coated and immersed in water.

evaluation, but this is not considered as a serious omission.

Package and Application Characteristics

The first properties to consider are those of the coating while in the package and those encountered in the application of the coating. Among these properties are solids, odor, brushability, drying characteristics, build, gloss and appearance. Such factors will determine, among other things, how many coats are required and how soon the pattern can be used. These properties are presented in Table 1.

Certain characteristics cannot be evaluated by counting up the results on an adding machine. The human element must be relied upon to judge some things, for example, brushability. The only possible way to evaluate brushability is to take a brush and apply the coating to a representative surface. Results obtained in this manner are presented as a numerical rating, starting with ten as the highest rating and going down to one as the lowest rating. Such ratings are not based on the judgement of one person, but are the average rating obtained by a number of experts, each making an individual evaluation.

In reviewing Table 1 it will be found that many of these characteristics are related to each other. Build is a good starting point for this discussion. The figure given in this table is the dry film thickness in thousandths of an inch (mils) obtained with one coat applied by brushing. No matter how good any pattern coating is, there has to be enough of it present before protection will be obtained. Some coatings have high enough build to give adequate protection with one coat, others do not have near enough build for one coat to suffice. The recommended minimum film thickness necessary for protection is one thousandth of an inch (1 mil). For good protection of wood it is best to have even higher build, preferably two thousandths of an inch (2 mils) or more.

Build is related directly to solids. It is quite obvious that no matter how much of a coating is applied to a surface there will be little left when the solvents evaporate unless the coating has a reasonable amount of solids. High solids contribute much to high build, good appearance and adequate protection.

Brushability is also related to build. It is that quality of a coating which pertains to the ease with which it brushes and how much can be applied before sagging or running occurs. Water certainly brushes easily, but how much water could be applied to a vertical surface before it would run? To have good brushability a coating should definitely brush well, but it must also have

proper body so that a reasonably thick film can be applied before it starts to sag. On the other hand, too much body will cause a drag or pull and the coating will be hard to brush. Final build is dependent on the amount of solids in the coating and on the thickness of the wet film applied.

Too Fast Drying Reduces Brushability

Drying time is the next logical consideration, for drying time ties in with brushability. Naturally, rapid drying is usually desired so that a second coat can be applied soon after the first coat, if a second coat is needed. Rapid drying is also desired so the pattern can be moved and put into use as soon as possible. However, drying that is too fast definitely interferes with ease of brushing. The film must stay wet for a reasonable amount of time so that areas can be lapped into each other without leaving obvious ridges. A nitrocellulose lacquer can be made to dry within a matter of a few minutes, but in a good brushing lacquer the drying is deliberately retarded to promote good brushability. Thirty minutes is about as fast as any coating can dry and still have good brushing qualities.

Another problem to be considered in a pattern lacquer is drying over wax. The ability of a coating to dry over wax is dependent upon the type of solvents used in the coating. If the proper solvents are selected no trouble will be encountered. However, the properties of some film formers are such that certain solvents are mandatory and these solvents sometimes do not permit good drying over wax.

The problem of application over wax calls attention to the fact that pattern coatings are at times applied over surfaces other than wood. Examples of such surfaces are plastics, plaster, and metal. There is little drying problem connected with these surfaces, but there may be a problem of adhesion. The property of adhesion over wood has not been discussed because all the coatings evaluated were found to have excellent adhesion to wood and any attempt to differentiate between them in regard to this property would be extremely difficult.

Some coatings were tested for adhesion over plastic fillets and metal with excellent results. A general comparison was not made, but it is very probable that adhesion problems may be encountered when some coatings are applied to surfaces other than wood. However, pattern coatings are available that will give satisfactory adhesion to these surfaces.

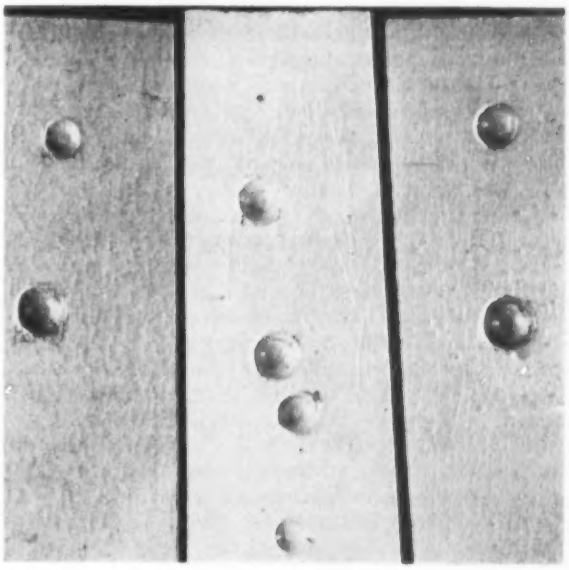
Gloss is not important from the standpoint of protection, but when a quality product is produced and finished most people prefer that it have a pleasing appearance. Hence, from the standpoint of appearance gloss is very important. There is no reason why a good organic coating should not have a high gloss and it will usually be found that good coatings do have good gloss unless they are deliberatedly "flatted" for a purpose. The gloss readings presented in the table were made on the Gardner 60° Gloss meter and a reading of 100 would represent a perfect gloss.

General appearance is a composite of build, gloss, leveling, holdout and that property of not raising the grain. Build and gloss have been discussed. Leveling is the ability of a finish to flow out uniformly and leave no brush marks. Holdout is quite important. Some strike-in is desired to obtain satisfactory adhesion, but the problem is usually to keep the coating from penetrating the wood excessively and giving the appearance of nothing on the surface. Finally there is grain raising, which is related to holdout. The better the holdout the less tendency there is to raise the grain. Grain raising is actually a swelling of the wood fibers and is caused by absorption of the thinners in the coating. Some thinners are definitely worse than others in their grain-raising tendencies.

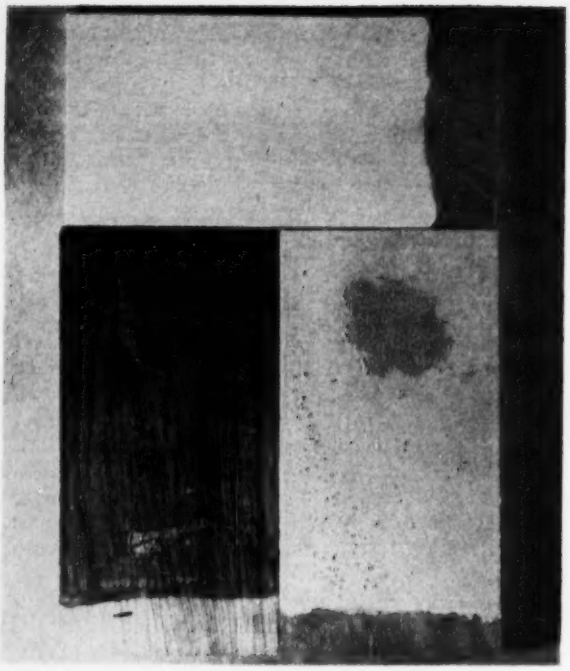
Shellac Used as Odor Standard

The final characteristic presented in Table I is odor. In a pattern coating odor is a very important thing and the paint formulator is very conscious of this fact. Much research work has been done to improve paint odors, not only in pattern coatings, but in all types of coatings. If shellac has one outstanding virtue, it is odor. Very few people consider the odor of alcohol in shellac as disagreeable. Odor is probably the main reason why shellac is still widely used as a pattern coating. For this reason shellac has more or less been established as a standard for odor in this pattern lacquer evaluation. In arriving at the ratings on odor the number of persons making the evaluation was greatly increased and the opinions of others, not necessarily paint experts, were also sought.

From the data presented in Table I it can now readily be seen that both shellac and crankcase sealer along with several other pattern coatings, have inferior build. Several others have acceptable build, but there are only two coatings that have high enough build to insure good protection with one coat application, Coating A and Coating E. The drying time of shellac is slow in comparison to the majority of these coatings. Actually the drying time of shellac will be further retarded by humid conditions due to its affinity for moisture. The drying time of crankcase sealer is too



Adhesion and flexibility under impact are shown by these wood panels finished with coating G (left), coating A (center) and coating D (right).



Mahogany panels finished with shellac (lower left), coating E (lower right) and coating A (top), illustrating effects of linseed oil-core sand resistance test. Shellac and coating E show serious sand sticking.

fast for proper leveling and good brushability. Crankcase sealer is low in gloss and shellac has only fair gloss. Shellac and crankcase sealer both rate below most other coatings in appearance. As stated previously, shellac does have a very acceptable odor, but Coating A has an odor that is as good.

Dry Film Characteristics

The dry film characteristics are presented in Table 2. This includes hardness, flexibility, abrasion resistance, heat resistance, water resistance, and resistance to core and and core sand binders. The dry film characteristics are a measure of the coating's ability to protect the pattern from the various external conditions it may be subjected to.

Hardness is commonly determined by means of pencils. The film receives the rating of the hardest pencil lead which will crumble rather than dig into the film. The hardest pencil used in such determinations is usually a 7H and the hardness then decreases down through the H's to 1H, then F, then HB then 1B, and up through the B's to 7B, the softest. Hardness is desirable in a paint film if it is not attained at the sacrifice of flexibility. A hard inflexible film will tend to chip, flake, and crack. Flexibility for this evaluation was determined by applying the coating to a flexible surface and then bending the surface to see how small a bend could be made before the coating cracked.

From flexibility and hardness, toughness or abrasion resistance can generally be predicted. A good balance between hardness and flexibility must be attained before a coating will have good abrasion resistance. The results presented in Table 2 were obtained with a Tabor Abrasor. The coating is first applied to a metal plate and allowed to dry 72 hours. The metal plate is then rotated in a circular motion against an abrasive wheel which is held against the coating at a constant pressure. By weighing the metal plate before and after the test the loss of weight because of the coating being abraded away can be determined. The smaller the loss in weight the better the abrasion resistance. For this test each coating was run for 500 cycles against a CS 10 abrasive wheel. This test can be compared to the abrasive action of sand and from the results, the wearing properties of these pattern coatings in relation to each other can be predicted.

The print resistance test conducted for this evaluation is a measure of the ability of the coating to withstand pressure at elevated temperatures without softening. This test is conducted at a temperature of 120 F which certainly cannot be considered extremely high. The film is allowed to dry 48 hours before being subjected to the test, which is simply subjecting the film in contact with cheesecloth to a pressure of 1 psi for one hour at the elevated temperature. The severity of the resulting impression, if any, is then observed. A coating that softens at 120 F is not practical for use on patterns.

Two very interesting tests were conducted with core sand mixtures. One using the common linseed oil binder and the other using the urea-formaldehyde, water-soluble core binder. These mixtures were applied against the dried films under pressure and the resulting amount of sticking, and film softening observed. These tests are very important because any worthy pattern coating should stand up very well under such conditions. Softening will result in ultimate film breakdown, and sticking, can very easily ruin the core itself.

Pattern coatings may be expected to come in contact with kerosene or gasoline and for this reason gasoline resistance tests were made. Coated wooden panels were immersed in gasoline for 24 hours and any softening, blistering or wrinkling was noted. No severe failures were observed, but several coatings softened noticeably.

Test Resistance to Moisture

One of the most important tests is the water resistance test. In this test small mahogany blocks were completely coated by dip application. These blocks were first weighed and then completely immersed in water. After 24 hours the blocks were removed and weighed again. They were then put back in water for 120 hours and then weighed a third time. In this manner the water penetrating the coating and being absorbed into the wood was determined. This test is a measure of the ability of a coating to seal wood against water. The importance of this test to the patternmaker is self evident. Some coatings not only failed as effective moisture barriers, but cracked and peeled from the surface of the wood.

A good pattern coating should show up well in all these tests. Just being outstanding in one particular test does not qualify a coating as being good. Particularly important are abrasion resistance, print resistance, the core sand resistance tests, and the ability to seal wood against water. Shellac makes a very poor showing in all these important properties. Crankcase sealer actually has better resistance to some of the tests than

some of the special pattern coatings. However, crankcase sealer falls below par on water-soluble core binder resistance, gasoline resistance and water penetration. Coating F has the best abrasion resistance but fails many of the other tests. Coating E has the best moisture sealing properties but shows poor abrasion resistance and a bad tendency to soften under any adverse conditions. Coating B also has good abrasion resistance, but is only fair in most of the other tests and has poor sealing properties. Coating A has very good abrasion resistance, very good moisture sealing ability and excellent resistance to all other tests. Coating C also has good abrasion resistance and very good sealing properties, but does not compare as well on the other resistance tests. Coating D fails badly on abrasion resistance and moisture sealing, but shows excellent results in all the other tests. Coating F is inferior in almost every respect, except as a moisture barrier.

Cost Considerations

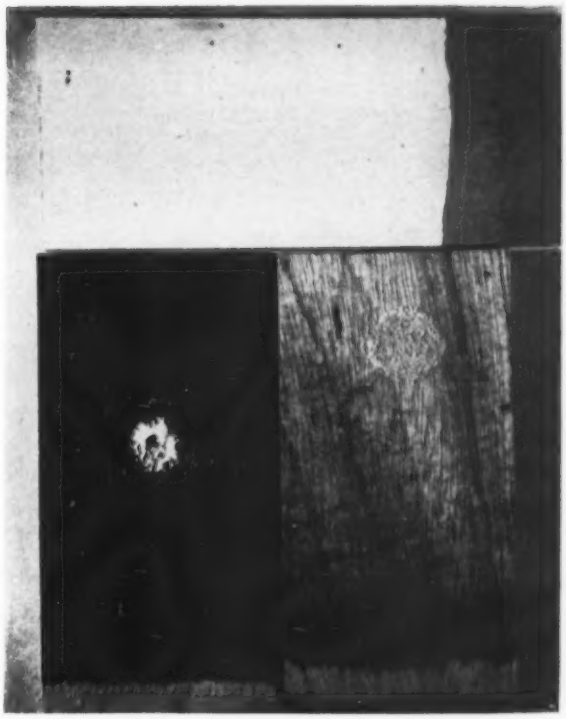
When considering the cost of a coating, one of the most important factors to take into account is the amount of solids or film-forming ingredients. The solids are the costly part of any coating. When the coating is applied and dries, all that will be left is the solids, and the thinner that was paid for will all be gone. If the coating was low in solids and high in solvent, most of what was paid for is lost. Naturally, the lower the solids the lower the cost. However, more of the low solids material will be required to equal the film thickness and protection attained with the higher solids coating. All the excess thinner and paint cans accompanying the low solids material represent costs of material for which the pattern maker does not receive any protective coating.

Another important factor is application time. High solids coatings permit a pattern to be properly covered with one coat. This cuts application time in half, or in some cases to one third. Time is money and therefore costs are again decreased through the use of higher solids coatings.

Last, but not least, is quality. It stands to reason that in a quality coating better raw materials must be used and this fact tends to raise the cost of higher quality coatings. However, it is well worth a few additional pennies to obtain the best protection available. After all, the cost of the pattern coating is but a small fraction of the cost of the entire pattern, but the function that it performs in protecting a product of considerable worth can be invaluable.

Shop conditions are important. There are no practical protective coatings that are absolutely odorless. For this reason the best ventilation possible should be employed. The painting area should be kept as clean as possible. In dusty areas keeping the floor moist or oiled will be of considerable help in keeping the air clean. Any contamination in the air will naturally adhere very well to a freshly painted surface and the result is a rough finish. Here again proper ventilation will be of great assistance in keeping air borne contamination to a minimum. The use of a fast drying coating will also minimize the effects of poor shop conditions.

Most pattern coatings are applied with brush and the selection of this brush is quite important. A coarse, short bristle brush will leave brush marks and cause streaking, sagging, and bubbling. The purchase of natural bristle brushes of reasonable bristle length will prove very worth while and the cost of such brushes is not excessive. A decent brush produces a much better appearing finish and permits the application of heavier coats without sagging. When applying the coating to a vertical surface the tendency to sag is also minimized if the final brush strokes are made vertically.



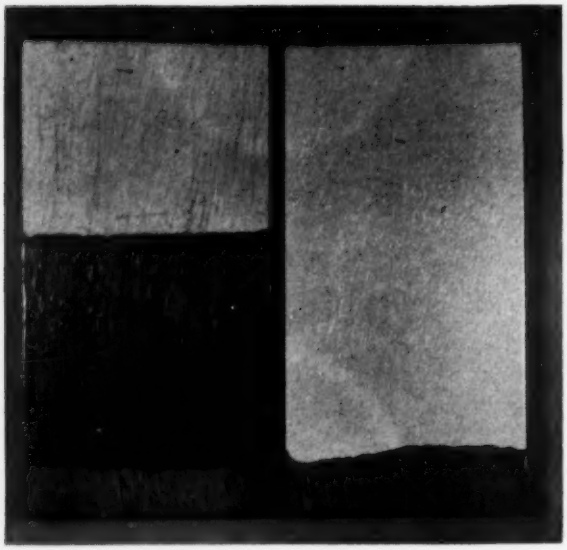
Mahogany panels finished with coating B (lower left), coating F (lower right) and coating A (top), demonstrating effects of water soluble core binder-core sand resistance test. Coating B shows moderate sticking and coating F shows very bad sticking in this test; A shows no effect.

At present, spray application is of minor importance in the pattern industry. However, it might be profitable for some of the patternmakers to investigate this possibility, especially the bigger shops. Spraying does require a spray booth, but the exhaust system of the booth will carry away most of the odors. Spray application is faster, permits faster drying and heavier application, gives better coverage on corners and results in better appearance.

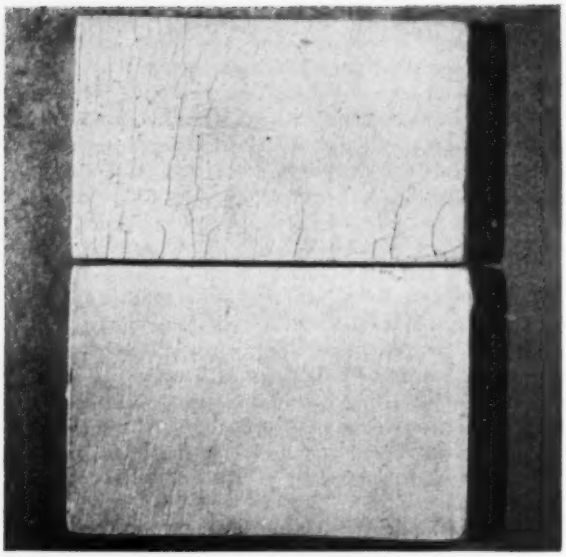
Guide to Choosing Pattern Coating

The purpose of this paper has been to show the members of the pattern and foundry industries what is available in a pattern coating. The inferior qualities of commonly used coatings have been stressed and facts have been presented to substantiate these claims. It can be seen that no pattern coating is perfect.

In the selection of a pattern coating the following items should be carefully considered as a guide to



Wood panels with shellac (left) and coating A (right) after water immersion. Note severe discoloration of the shellac because of noticeable affinity for moisture.



Wood blocks finished with coating D (top) and coating A (bottom) after 24-hour water immersion. The failure of coating D, through cracking, is readily apparent.

obtaining the best available product:

1. The solids should be high and brushability good so that sufficient build can be obtained with one coat to provide ample protection.
2. The drying time should be reasonably fast, in the neighborhood of 30 to 45 minutes. The coating should dry equally well over all surfaces.
3. The gloss should be high, grain raising tendencies low, and the coating should level out well if good appearance is desired.
4. The odor should be mild and acceptable.
5. The film should be hard and flexible so that abrasion resistance is high, providing long life before recoating is necessary.
6. The film should be unaffected by reasonably high temperatures.
7. The film should be resistant to core binders and release agents and should not cause sand sticking at reasonable pressures.
8. The film should be unaffected by gasoline or kerosene.
9. The film should be an effective seal against water penetration.

It is hoped the data and comments presented will enable the users to select a pattern coating, such as Coating A, that will do a quality job for them, for such pattern coatings have been made available through extensive research. While the paint industry is justifiably proud of such coatings, there is still some room for improvement. The paint industry is highly competitive and patternmakers can demand and obtain from it pattern coatings as they want them.

Heat Shield for Cupola Charging Door

Loose chains suspended from top of charging door provide effective heat shield for men working nearby. Chains, which do not interfere with operation of charging bucket, provide some protection against workmen falling into cupola when it is empty. (Reported by Tom Butler, Ford Motor Co., Dearborn, Mich.)

Hot Boxes Bake Cores Without Use of Driers

W. M. Peterson / *Chemist, M. A. Bell Co., St. Louis*

Core making has been the biggest bottleneck in many foundries for years, especially where many small, fairly intricate cores are required. Dielectric ovens have solved this problem in some instances, but for many the capital investment is too great; driers are necessary, and the type of binders used is not entirely satisfactory with all metals. To meet the need, a system of making and baking cores in one operation without the use of driers has been developed.

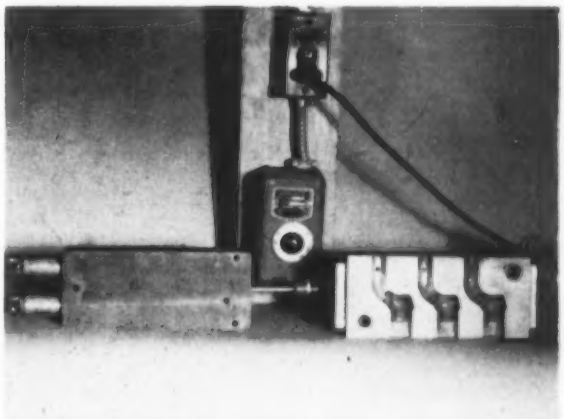
■ The equipment necessary is a suitable core blower and an electrically heated core box. The only requirement of the core blower is that it be so constructed that either the core box may be removed while still clamped or the blowing head be free to move away from the heated core box. One of these precautions is necessary to keep the sand mixture in the blowing head from becoming too warm and driving off the moisture prematurely. Most standard core blowers will meet one of the requirements with little modification.

Many electrically heated core boxes are in common use today for shell molding, so considerable experience in constructing this type of box is in the hands of patternmakers throughout the country. Blow boxes already in service can be converted to heated boxes with a few very simple modifications. Whether a new box is made or an old one converted, a heat reservoir is essential for even, continuous heating. This reservoir should weigh at least five times as much as the core box, be the same dimensions as the sides of the core box to which it will be attached and have sufficient thickness so that bayonet type heaters may be inserted. Gray iron seems to have the best heat properties of any metal for the heat reservoir.

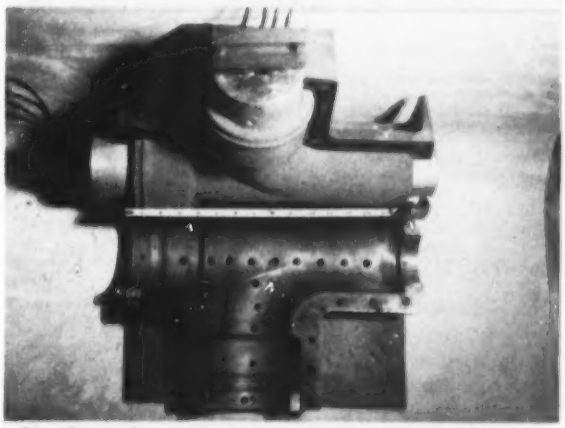
Heating Large Cores

For large cores which will not bake through in the box in a reasonable time, heating from both inside and outside is used. This is illustrated by the pipe T which is produced with a hollow core. Baking time was held to 90 seconds.

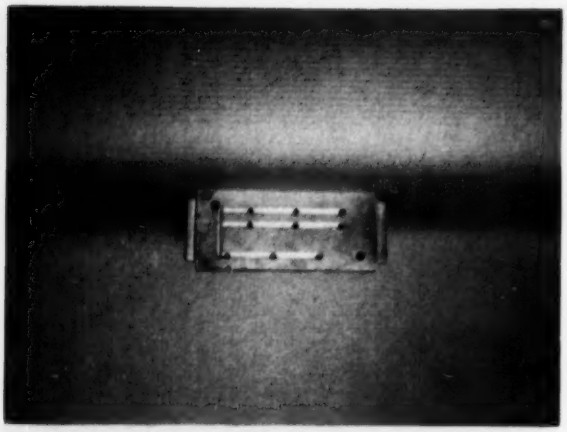
For heating the reservoir, enclosed bayonet type resistance heaters are very satisfactory. These are manufactured in various lengths and watt ratings so



Exploded view of 4-in. x 8-in. core box, showing (l. to r.), resistance heaters, heat reservoir, on-and-off thermostat, and aluminum core box. Two 600-watt heaters in each half of the core box produced enough heat to operate continuously on a 10-second cycle. Larger cores require more time for the production process.

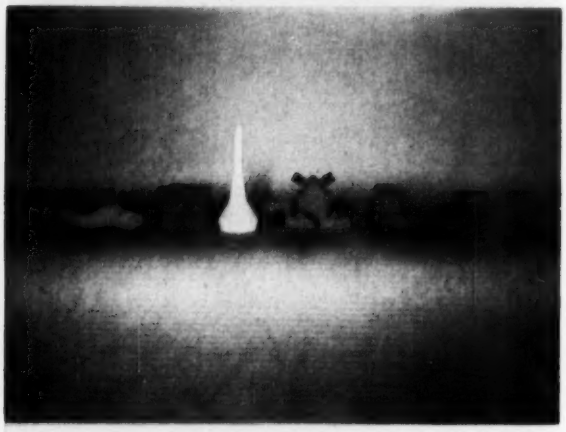


Pipe T core box with core inserted to illustrate arrangement. Box was heated both on the inside and outside. Blow holes were drilled out before box was parted. A better arrangement would be to place the blow holes along the parting line rather than as shown here.



Picture of back of core box, showing a common venting arrangement, allowing core removal by compressed air.

Two-ounce cores made three to the box, using 10-second cycle. Sectioned brass casting showing cavity formed.



This group of cores was made experimentally, using the hot core box method of baking and drying.

almost any core box can be heated satisfactorily with standard heaters. The number of heaters required will depend upon the size of the core to be produced and the cycle which the core box is expected to maintain. It is better to have more heaters than necessary and let them rest part of the time than have too few and have the operator waiting for the box to come up to temperature. Constant heat control can be maintained by having an off-and-on thermostat actuated by the tip being embedded in the heat reservoir. Many standard thermostats on the market will serve the purpose but care should be exercised in selecting one that will operate at temperatures up to 500 F.

Adequate Venting Needed

The core box itself should follow ordinary design with the possible exception that sand cavities, which are sometimes left open, should be enclosed with metal to facilitate the baking process. Venting should be adequate so that the sand cavity can be filled in the shortest possible time. Venting is also necessary to allow the volatiles from the core sand mix an easy route of escape. Usually more vents are required than are usually placed in a blow box and they should be slightly larger, where possible. As many vents as possible should be brought to a common vent leading to the outside of the core box. This is necessary to expedite core removal from the core box with a stream of compressed air.

Sand Mixtures Critical

The sand mixtures are the most important part of the whole process. The binders used must set in a matter of seconds; complete their drying cycle by air drying; have no obnoxious odors; must not swell under heat; must not stick to the heated core box; and last but not least, be in a price range foundries can afford. Two core sand mixtures were found which would meet above requirements, but undoubtedly more will be found if a further search is conducted.

For large cores such as the pipe core shown in the illustrations, the following mixture proved satisfactory:

100 lb Washed and Dried Silica Sand (GF 60-80)
1/4 lb Corn flour
3 lb Core Compound
4 lb Water
1/2 lb Release Agent

The mixing procedure is important. Add the dry ingredients and mix for a few seconds. Add the water and mull for four minutes minimum. Add the release agent and mull for one minute. Thorough mulling is necessary.

For Stored Cores

For cores which are to be stored for a period of time or which will remain in a green sand mold for some time before pouring, the following mixture proved satisfactory:

100 lb Washed and Dried Silica Sand (GF 60-80)
2 lb Core Compound
4 lb Water
1 lb Core Oil

Here again the mixing procedure is important. Mix the dry ingredients for a few seconds. Add water and mull for four minutes minimum. Add core oil and mull for two minutes.

While washed and dried sand was used in the de-

View of pipe T core, showing hollow inside. Thickness of core was held to measurement between ½ and ⅝ in.

velopment work, any reasonable core sand will serve. Finer sands work better than coarse sands, which is the usual case with blown cores. The hot strength of the mixture may be varied to take any kind of metal. For high hot strengths it is well to add fire clay or silica flour. Bentonites tend to detract from the dry strength of the core and should be avoided where possible. When silica flour is used, a little additional moisture should be added to satisfy the fines.

Making the Core

The operation of the heated core box is quite simple. First, the core box is brought up to temperature. Experience has shown that temperatures between 400-425 F give the best results. Whatever temperature is found to be best for a particular core must be retained within narrow limits during the baking process so that the core box does not contract around the core, making it difficult to remove from the box.

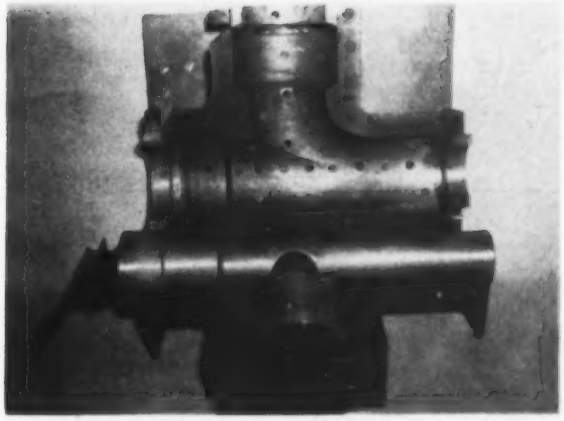
The core is blown and the baking time is allowed while the core box is still clamped. The baking time will have to be determined by trial and error for each core box. Small cores may be removed after 10 seconds baking time while larger cores may require as much as 90 seconds. To remove the partially baked core, the core box is pulled apart leaving the core in one of the halves. Final removal is accomplished with compressed air applied to the common vent of the core box half in which the core is retained. The core is then placed on a plate and allowed to air dry before use. The air dry phase is rather rapid and most cores can be used within a few minutes after blowing.

Close Tolerances

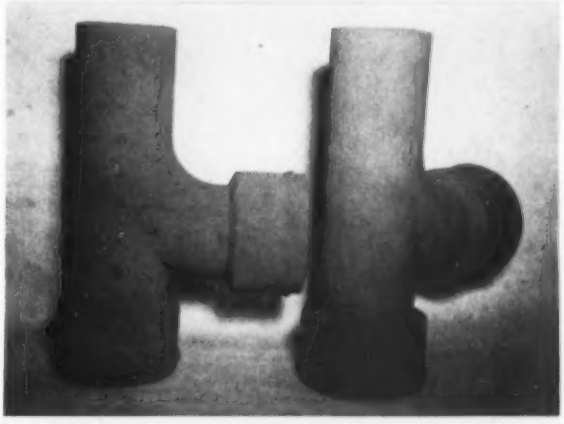
Cores made by the above method can be held to exceptionally close tolerances and are perfectly true to shape. These qualities should have more than passing interest for the foundrymen working with permanent or shell molds. With true prints, crushes and runouts can largely be avoided.

Test castings using cores made by the method described have been poured in aluminum, brass, and gray iron. The cores stood up well while the castings were being poured and shook out easily in all cases.

With this system, using an adequate core blower and electrically heated core box, it is possible to bake cores without the use of driers and to produce them in short order. A one-step operation of this type is most likely to relieve the core-making bottleneck where small, intricate cores are required in quantity. This method offers a solution particularly where the heavy investment in dielectric ovens is not justified.



View of pipe T core box, showing arrangement for heating inside and producing a hollow core.



Four-inch pipe T weighing 8 lb, made in 90-second cycle.

Gray iron pipe T cavity, formed by 90-second core.

Convention paper ★

A Simplified Cost System For Small Jobbing Foundries

ROY W. McDONNELL / *Treasurer, Letson & Burpee, Ltd., Vancouver, Can.*

Keeping in mind that you can't spend more money keeping track of foundry costs than you do producing castings, the author has outlined a simple cost system applicable to small shops. While not opposed to detailed, complicated systems, he feels there is need for an elementary method of determining foundry costs.

■ The overall cost of setting up and operating a detailed cost system is approximately the same for a foundry producing 500 tons a year as it is for a foundry producing 50,000 tons, but the cost per pound of such a system in the smaller plant, would be prohibitive. The smaller jobbing foundries need a simple method of accounting for foundry costs. They need a system that gives reasonably accurate costs without requiring a battery of cost accountants or industrial engineers. A review of the author's cost system may be helpful even to foundries which have systems tailored to their own individual needs.

First, consider the items that make up costs of operating a foundry. They can be classified under five main headings.

DIRECT PURCHASES

Scrap iron
Pig iron
Ferroalloys
Lime rock spalls
Coke
Refractories

CUPOLA MEN'S TIME

DIRECT LABOR

Molding time
Core time

FACTORY EXPENSES

Casting time
Chipping time
Supervision
Helpers
Stock cores
Errors & defects
Holiday pay

EXPENSES—(Cont.)

Machine repairs
Building repairs
Small tools
Supplies—such as
  Molding sand
  Chaplets
  Plumbago
  Parting materials
Power, light, heat, and water
Depreciation
Misc. expenses
Group insurance
Unemployment insurance
Workmen's compensation

ADMINISTRATIVE

Office salaries
Auto expenses
Travelling
Advertising

ADMINISTRATIVE—(Continued)

Legal
Telephone & telegraph
Office expenses
Subscriptions & dues
Donations
Bad debts
Shipping and receiving
Truck expenses
Exchange & bank charges
Selling expenses
Interest paid
General expenses
Insurance
City taxes & license

It can be seen that the total of direct purchases and cupola men's time gives the cost of iron at the spout of the cupola. This figure, divided by the total pounds produced in a given period, gives the cost of melted iron per pound at the spout of the cupola. This can also be calculated from past experience as shown in the following example.

Cost of a 700 pound cupola charge of gray iron

Pig Iron, 140 lb	@	$79.40/ton	$ 5.56
Returns, 100 lb	@	42.00/ton	2.10
Scrap Steel, 70 lb	@	28.00/ton	.98
Scrap Iron, 390 lb	@	42.00/ton	8.19
Manganese Briquettes, 7 lb	@	.149/lb	1.04
Ferrosilicon Briquettes, 5 lb	@	.1055/lb	.53
Silicon at Spout, 2 lb	@	.236/lb	.47
Cost of Metal Charged, 714 lb			$18.87
Lime Rock Spalls, 21 lb	@	$ 8.50/ton	.09
Patching Refractory, 25 lb	@	2.58/100 lb	.65
Coke, 167½ lb	@	34.05/ton	2.85
Cupola Men's Time	@	.0052/lb	3.71
Total Cost of Charge of 714 lb			$26.17
Less returns, 15 per cent 107 lb	@	$42.00/ton	2.25
607 lb			$23.92
Less 5 per cent loss 36 lb			
Salable Castings 571 lb			$.0419/lb

To keep this paper as simple as possible, 4¢/lb will be used for the melted cost of iron. This figure should remain fairly constant except for any major changes in the cost of material or labor.

Direct Labor, is variable. This time must be kept separately and charged to the individual job on a work order or some similar method. Factory Expenses plus Administrative Expenses constitute total overhead. This can be added to costs on a percentage basis.

As an example, take a past year's or a past month's operation from the profit and loss statement or general ledger. As this system is simple and easy to keep up,

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it is suggested that monthly figures be used and kept up to date. Here is a typical month's operation showing the operating costs and expenses in total only for the sake of simplicity.

Total Sales			$16,000.00
Opening Inventory		$2,000.00	
Direct Purchases		2,300.00	
		$4,300.00	
Less Closing Inventory		1,000.00	
Total Direct Purchases		$3,300.00	
Cupola Men's Time		700.00	
Melted Cost of Iron at Spout of Cupola		$4,000.00	
Direct Labor (molding and coremaking)		2,000.00	
Direct Costs		$6,000.00	
Factory Expenses	$6,500.00		
Admin. Expenses	1,900.00		
Total Overhead		8,400.00	
Total Costs			$14,400.00
Net Profit Before Taxes			$1,600.00

Tonnage Produced: 100,000 pounds; Average Cost per lb: $.144; Melted Cost per lb: $.04.

The problem now is to distribute the total overhead of $8,400.00. There are three ways this can be done but the one used should be the fairest, most accurate, and most equitable. The three methods are:

1. On the direct labor of $2,000.00. Overhead: $8,400.00 or 420 per cent.

2. On the direct costs of $6,000.00. Overhead: $8,400.00 or 140 per cent.

3. On the tonnage or pounds produced—100,000 lb. Overhead: $8,400.00 or $.084 per pound.

The following examples assume a molder is paid $1.85 per hour.

	METHOD 1	METHOD 2	METHOD 3
EXAMPLE A			
A 100-lb casting with 1 hr molding			
Melted Cost—100 lb @ $.04	$4.00	$4.00	$4.00
Direct Labor—1 hr @ $1.85	1.85	1.85	1.85
Total Direct Costs	5.85	5.85	5.85
Overhead	7.77	8.19	8.40
Total Cost	$13.62	$14.04	$14.25
Cost per lb	.1362	.1404	.1425
EXAMPLE B			
A 200-lb casting with ½ hr molding			
Melted Cost—200 lb @ $.04	$8.00	$8.00	$8.00
Direct Labor—½ hr @ $1.85	.93	.93	.93
Total Direct Costs	8.93	8.93	8.93
Overhead	3.91	12.50	16.80
Total Cost	$12.84	$21.43	$25.73
Cost per lb	.0642	.1072	.1287
EXAMPLE C			
A 50-lb casting with 2 hr molding			
Melted Cost—50 lb @ $.04	$2.00	$2.00	$2.00
Direct Labor—2 hr @ $1.85	3.70	3.70	3.70
Total Direct Costs	5.70	5.70	5.70
Overhead	15.54	7.98	4.20
Total Cost	$21.24	$13.68	$9.90
Cost per lb	.4248	.2736	.199

In Example A, possibly an average casting, the method used makes little difference. The cost per pound is about the same. However, Examples B and C show sharp fluctuations in the cost per pound. While the last two examples are possibly extremes they are certainly not ridiculous.

The writer advocates the middle of the road method (Method 2) for recovering the total overhead. Charging out rates, which are derived from a cost system, must do two things. First, recover all costs and a fair margin of profit and second, give a selling price that is in line with competition. In the author's company, Method 1 and Method 3 fail to give a price in line with competition. The cost in Method 1, Example B, is too low, giving only $3.91 towards overhead or $.0195 per lb whereas many items in overhead vary directly with the weight of casting produced. For example, casting time, chipping time, helpers, molding sand, plumbago, truck expenses, shipping and receiving, etc.

In Method 1, Example C, cost is too high. An overhead figure of 420 per cent on molding labor of $1.85 means that molder's time has to be charged at $9.62 per hour. It is quite possible for a molder to have 1 1/4 hours on a casting one day, 1 hour on the same casting the next day, and 3/4 hour on the following day. Time has been reduced 1/2 hour but costs have not been reduced $4.81. If, in using Method 1, molding time can be cut in half by using match boards, calculated costs are cut drastically whereas the only cost actually cut is molding. Casting time, chipping time, helpers, etc., remain the same per pound with no extra overhead to compensate for it.

In Method 3, Examples B and C, costs are too high and too low respectively. Some factory expenses such as chipping time, supervision, rejects, etc., do have a bearing on the molding and core time and Method 3 applies no overhead to the molding and core time.

Method 2, applies some of the overhead on the molding and core time and some on the metal, which seems to be the fairest on this simple cost system basis.

Now it becomes fairly simple to figure the cost and selling price of a casting:

Weight of Casting	500 lb @ $.04	$20.00
Molding and Core Time	5 hr @ 1.85	9.25
Direct Costs		$29.25
Overhead	140 per cent	40.95
Total Cost		$70.20
Profit	say 10 per cent	7.02
Selling Price	$.1544 per lb	$77.22

Or, for simplification, the selling price is 2.64 times the direct costs and this can be added to the cost of the melted metal bringing it up to $.1056 (2.64 x $.04) and added to the molding time bringing it up to $4.884 per hour (2.64 x 1.85). Then selling price becomes

500 lb	@ $ .1056	$52.80
5 hr	@ $4.884	24.42
Selling Price		$77.22

Thus, rate per pound on metal and a rate per hour on molding and coremaking have been established.

When making special irons, the cost of the nickel, chromium, and other additions to the charge of iron should be added to your selling price after overhead and profit at cost plus a percentage for profit. For instance, if the cost of the additions to produce a 2 per cent nickel casting amounted to $0.15 per lb the charge might be $.02 per lb extra.

Many foundries are operated in conjunction with machine shops under one roof and some firms have difficulty in allocating the overhead common to both

departments. For instance, they might have only one shipper and receiver, salesmen selling for both foundry and machine shop, and an office administering both divisions. They also might have trouble with some of the depreciation, building maintenance and other items impossible to break down between foundry and machine shop. This can be overcome by putting these items in a general overhead group and pro rating the total between the foundry and machine shop.

Need Estimator

Regrettably, this system does not do away with an estimator. Whether a shop makes or loses money on a job depends a great deal on his skill. At any rate, it gives him a formula with which to work and many foundries do not know their costs on a job even when they know the time and the weight of the castings.

Then too, it must be remembered, that increasing capacity 50 per cent by simply adding more men to the payroll, does not increase total overhead 50 per cent. Many items do not increase at all and some very little. Other items of course will increase in direct proportion to the increase tonnage. Should the opportunity of a very large order come up which will increase normal production considerably, an operator might be wise to take these factors into consideration.

This article was written with small jobbing foundries in mind. Manufacturing foundries with multiple production runs present different problems and where chipping and helping time, etc., can be charged directly to the job some different method of applying the overhead such as on the direct labor might be more feasible. However, when these charges are put in overhead it means the greatest portion of foundry cost is being applied on the smallest portion on a percentage basis if applied to the direct labor. It is far better to apply this overhead figure on the greater figure of total direct costs which will help reduce sharp fluctuations on individual job costs.

Not Foolproof

This is not suggested as a foolproof system but the writer believes it will give small jobbing foundries a reasonably accurate method of determining their costs on individual jobs with a minimum amount of trouble and expense. Many systems and ideas have been brought forward during the past 15 to 20 years but one must wonder if the old time foundry operators were far wrong when they set price lists where the selling prices per pound were reduced as the weight of the casting increased and placed a premium on the list for castings of a more complex nature.

Recognize 44-Year Service

Recognizing 44 years of service to the foundry industry, the Foundry Educational Foundation presented Robert E. Kennedy with a citation on the occasion of his retirement from the University of Illinois faculty. In the picture, Mr. Kennedy (right) is receiving the citation from Marion J. Allen, American Steel Foundries, Chicago, FEF board chairman. Applauding is C. J. Freund, dean of engineering, University of Detroit, and (back to camera) F. W. Trezise, dean of engineering at the U of I, Chicago Undergraduate Div.

Secretary emeritus of A.F.S., "Bob" Kennedy retired from the Society staff in 1945, soon returned to teaching (he taught at the U of I Urbana campus most of the period 1910 to 1921). In 1921 he became assistant secretary of A.F.S., receiving the Joseph S. Seaman Gold Metal in 1945.

Two Recent Publications

American Foundrymen's Society has recently issued two new publications which foundrymen will want to add to their libraries. They are *Recommended Names for Gates and Risers* and *A.F.S. Glossary of Foundry Terms.*

Recommended Names for Gates and Risers is an 8-page, well illustrated pamphlet recently prepared by the Gating and Risering Committee, Gray Iron Division of A.F.S.

The new publication is designed to provide a convenient source for gray foundry terminology, with accurate definitions of the more common nomenclature. The pamphlet should simplify the learning process for newcomers and furnish a reference for veteran foundrymen. Recommended standard names for gates and risers are set in capital letters, while other commonly used synonyms are shown in parentheses. In addition to the definitions, a brief preface presents a generalized description of the elements of a basic gating system.

The manual is ideal for students and apprentices and will find real use in any foundry. The booklet is priced at 25¢ to A.F.S. members, 40¢ to non-members. The information has also been printed in wall chart form, which is available at the same prices.

A.F.S. Glossary of Foundry Terms is a 78-page booklet of the foundrymen's own language. Its purpose is to materially serve in creating a better understanding between foundrymen when they refer to specific elements of the casting process.

In consolidating the work of the committee members of the A.F.S. Foundry Terminology Committee, reference was made to many presently existing glossaries and dictionaries of scientific and engineering terms. The booklet sells for 75¢ to A.F.S. members and $1.25 to non-members.

Rapid Control Method for Silicon in Malleable

Control of silicon and manganese content in the melting of iron for malleableizing is of the greatest importance and the speed with which analyses for these elements can be obtained can contribute greatly to uniformity of control. In the method described here by A. E. Cartwright, metallurgist for Crane, Ltd., Montreal, each step of the process for determining silicon has been studied with a view to speed.

■ A determination of manganese can be run very rapidly by the persulphate method, but silicon, at best, has always been a much slower process because of the time required for acid solution of the sample, dehydration, re-solution, filtering, washing, ignition and cooling for weighing. The advantages to be gained in obtaining rapid results for silicon are so important that the author decided to investigate every possible means for stripping minutes from the time normally consumed for this determination, and arrived at a procedure that could be made to produce an accurate determination in 15 to 20 minutes from time of casting the sample to final weighing of the silica.

Rapid cooling by placing ignited crucible on copper block saves time in rapid determination of silicon.

Cast a wafer sample, quench, and reduce in a hardened steel mortar to pass 70 mesh. Weigh 1.0 gram of the sample into a 250 ml covered breaker and dissolve in 10 ml perchloric acid (70-72%) on a hot plate.

When in solution, partly remove cover and fume heavily for 3 to 4 minutes. Cool, add 50 ml distilled water, bring to boiling and filter with suction through a tared platinum Gooch crucible with asbestos pad. The asbestos fibre pad is carefully prepared to minimum adequate thickness and washed thoroughly with perchloric acid of the same concentration as in filtering the sample, then with water and finally with 1:1 hydrochloric acid, dried and ignited to constant weigh in a muffle furnace at 1800 F. This pad can be re-used indefinitely by periodically emptying out the accumulated silica.

In filtering the sample, a minimum of hot water from a fine nozzle wash bottle is used in removing silica from the breaker with the aid of a policeman. Following this the filtrate is removed for chromium check and three washings each of 10 ml hot 1:1 hydrochloric acid are given the residue.

The Gooch crucible is removed, dried on the hot plate or in front of the muffle furnace for 1 minute and ignited in the muffle for 3 minutes at 1800 F. When removed from the muffle, the Gooch is placed on a thick block of pure copper and is cooled for weighing in 1 minute.

This method has been in use for some time in the author's laboratory with outstanding success and has contributed greatly to effective melting control. At the same time, it is realized that this may not be the ideal solution to rapid silicon determination and further discussion or contributions would be appreciated.

Rebuild First Foundry

Re-creation of the three-century-old Saugus Iron Works, Saugus, Mass., is well on its way with the completion last summer of the replica of the original blast furnace and reconstruction of the old forge building expected to be completed by the fall of 1953. First successful ironworks to be operated in the colonies, the plant dates back to 1646. It is being restored by the First Iron Works Association, Inc., with financial support of the American Iron and Steel Institute, and is scheduled for dedication as an industrial shrine the summer of 1954.

During the past four years, extensive exploration and reconstruction has been going on at the site and over five tons of relics have been taken from the ruins. The ironworks site is open to the public seven days a week. Visitors are welcome to tour the Iron Master's House, which has been completely refurnished with period pieces, visit a museum on the grounds, and view reconstruction activities from the restored charging bridge of the blast furnace.

Melting Iron in the Reverberatory Furnace

J. G. WINGET / *Manager, Furnace Div., Reda Pump Co., Bartlesville, Okla.*
H. E. SIMMONS / *Metallurgist, Reda Pump Co.*

In a reverberatory furnace, the open flame passes over the metal bath. The metal is heated by a combination of direct flame impingement, and by reflected heat from the roof and side walls. This paper discusses experiences of the authors with furnaces of this type used by Reda Pump Co.

■ The furnaces used by Reda Pump Co. are designed for batch melting of ferrous and non-ferrous metals and alloys. They are planned for maximum melting efficiency, yet feature simplicity in every detail. Figure 1, a cross-sectional view of the furnace shows dimensions of the various sizes used in the authors' plant.

In operation the furnace is preheated until the refractory reaches at least the pouring temperature of the metal to be melted. When preheating is complete, the charge of cold metal is dropped into the top of the stack. The charge may consist of scrap, pig or foundry returns. Material should be selected on the same basis as for any other melting unit, for the same metal. Of course, it must be properly sized for admittance into the stack. Melting actually takes place at the base of the stack. Waste gases passing through the balance of the charge preheat it prior to its reaching the melting zone. After melting, the droplets of metal flow down onto the flat hearth. Temperature here is built up by reflected heat from the roof and side walls, by conduction from the hearth, and by heat of the flame itself passing over the top of the metal bath.

Uses Gas or Oil Combinations

Fuels used for combustion are gas, oil, or gas and oil in combination. Each fuel has its own merit, and each is satisfactory if properly used. Natural gas, where it is available, is usually more economical than oil. Gas melting is cleaner, and in general less troublesome than oil melting. Gas melting may be considered as being generally more efficient, not so much because of the heating values of the respective fuels, but because of fewer variables, in getting proper combustion. Gas is introduced in its natural state into the blower, where it mixes readily with the air, while oil must be atomized mechanically. It is in the atomization that most troubles with oil firing are encountered. This will be discussed fully later. Combination gas-oil firing is a relatively new idea in this type furnace, which offers a sound solution to the major problems of ferrous melting. This too will be fully discussed.

When melting with gas, there is ordinarily a minimum of experimentation necessary to determine correct furnace setting. By comparison, oil firing offers numerous possible combinations of oil and air, using varied pressures and flows of oil, etc. The amount of oil introduced into the furnace depends on the size of atomizer tip used, and on the line pressure. For example, in melting tin bronzes, we have used 100 psi line pressure with a 21.5 gph atomizer tip. This has given a seemingly very good and efficient operation. We now find that perhaps a better operation is given by the same pressure and a 17.5 gph tip.

One user has found his best results come with a 21.5 gph tip and only 60 psi line pressure. Consumption at this setting is approximately 17-18 gph. In melting an alloy iron, such as a high nickel-chromium alloy which requires a pouring temperature of 2700 F, a line pressure of 120 psi with a 21.5 gph tip may be required for a good operation in the same size furnace. Here again, there may be a question as to whether 120 psi pressure and a 21.5 gph tip is preferable, or whether a pressure of 100 psi and a 24.5 gph tip might be still better. Of course, the variation in grades of oil, in temperature of the oil, etc. have a great deal to do with the relative efficiency of either.

Experience has proven that, when operating properly, an oil-fired furnace is faster than one that is gas fired, although preheating is some 50 per cent

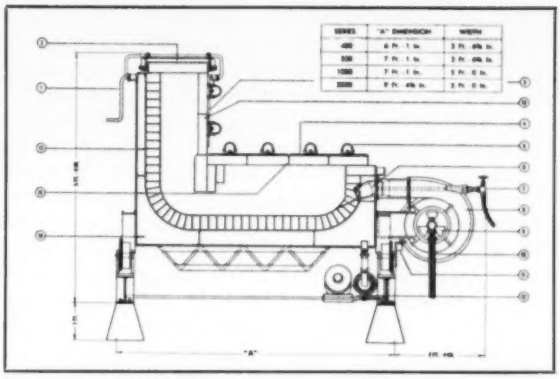


Fig. 1—Cross section of stack charge, reverberatory furnace, showing various dimensions.

longer with oil. Figures 2 and 3 indicate fuel consumptions and costs for both gas and oil. Reference to Fig. 4 in conjunction with Figs. 2 and 3 gives a complete picture of performance and costs of a typical day's operation.

Good Maintenance a Must

Certain dimensions on the furnace may be considered critical and must be held within reasonable limits if the performance indicated in Fig. 4 is to be had. Referring to Fig. 1, the baffle opening (from hearth to bottom of baffle) and the stack exhaust opening are the most important dimensions. The former should be between 6 in. and 9 in. and the latter 45 to 60 sq. in. on the smaller series and a maximum of 115 sq. in. on the larger sizes; both should preferably be in the lower range of these figures for highest efficiency. This is particularly true when melting irons requiring temperatures much in excess of 2700 F. If either the throat, bottom, or sidewall areas deteriorate too greatly, reduced efficiency will also result. In plain language, the furnace must be properly maintained for best results.

The shape of the burner port is extremely important. If either flame angle or direction is incorrect, efficiency may be reduced to the point where it is impossible to pick up sufficient temperature. Fuel economies suffer proportionately. If the burner port entrance angle causes sharp flame impingement, the lining may be severely cut by the resulting abrasive action. To assure correct forming of this very critical shape, we use, and highly recommend, a "port former." In our case, we use an aluminum casting of the correct shape. One end is machined to a slip fit into the burner casting, thus eliminating danger of getting refractory rammed into the burner. After the "port former" is inserted, a ramming or castable refractory is rammed around it, assuring the exact shape of the port.

Earlier it was stated that correct gas firing depended on fewer variables, and therefore might be considered more efficient than oil firing. This is primarily due to the fact that, prior to entering the furnace, the oil must be as nearly like gas as possible—it must be atomized to a vapor and as well mixed with air as is possible. Mechanically, it is imperative that the atomizer be located centrally and be inserted the correct distance into the burner. Pressure must be steadily maintained, and the atomizer tip must be kept clean to insure a uniform supply of oil. The dimension of the opening in the atomizer tip must be checked frequently, as abrasion from the oil will steadily enlarge it. This admits more oil and at the same time reduces the degree of atomization.

How to Check Burner Port

Once established, these mechanical items should offer no further problem. Therefore, the most important point for inspection in the combustion system is the burner port mentioned earlier. The atomized oil spray must not impinge on anything prior to its combustion. It is interesting to see how a very tiny bump or ridge of refractory in the burner port will completely break up the spray cone, causing the oil to flow down into the furnace. It is best to check for this condition prior to replacing the furnace lids. To check properly, the burner should be lit, just as when melting, and a close observation made to see if any tiny rivulets of raw oil are flowing. If so, there is some impediment in the burner port.

In oil firing, one easily-recognized point should be remembered. In operation, no smoke or oil fumes should be seen exhausting between the refractories and the shell. This is an indication of incomplete combustion within, and will result in lower temperatures, longer melting time, and—quite frequently—in oxidized metal. Reason for this oxidation lies in the fact that the air which normally would be mixed with the atomized oil is passing through the furnace in a free state. This cannot be corrected by simply increasing the oil supply, as this frequently will aggravate an already wrong condition. In other words, the air and fuel must be added in the proper proportions, and, even more important, they must be

Reladling ductile iron for ferrosilicon addition in the foundry of Reda Pump Co., Bartlesville, Okla.

Series	Metal	Heat	Cu. Ft. Per Ht.	Cost Per 1000 Cu. Ft.	Cost Per Ht.	Cost Per Ton
400	Iron	400 #	2100	$0.20[1]	$0.42	$2.10
	Bronze	450 #	705	$0.20	$0.14	$0.62
550	Iron	550 #	2700	$0.20	$0.54	$1.96
	Bronze	600 #	875	$0.20	$0.18	$0.58
1000	Iron	1000 #	3350	$0.20	$0.67	$1.34
	Bronze [2]	1150 #	1600	$0.20	$0.32	$0.57

1 Industrial Rate 2 Estimate Based on 4 Hrs. Production Run

Fig. 2: Gas Consumption (1000 BTU/Cu. Ft.)

Series	Metal	Heat	Gallons Per Ht.	Cost Per Gal.	Cost Per Ht.	Cost Per Ton
400	Iron	400 #	12.0	$0.12	$1.44	$7.20
	Bronze	450 #	4.0	$0.12	$0.48	$2.14
550	Iron	550 #	15.5	$0.12	$1.86	$6.76
	Bronze	600 #	5.0	$0.12	$0.60	$2.00
1000	Iron	1000 #	19.0	$0.12	$2.28	$4.56
	Bronze	1050 #	9.0	$0.12	$1.08	$1.88

Fig. 3: Oil Consumption (No. 2 or No. 3 Fuel)

properly mixed before complete and efficient combustion can result.

The reader may wonder why, with these variables in securing proper mixtures for combustion, a proportioning type blower and mixer are not used. The reason is quite simple. If all dimensions, throughout the complete combustion chain, could be constantly maintained, we could do so. Unfortunately, the refractories throughout the furnace burn away steadily. Thus, as the opening beneath the baffle between the sidewalls, in the throat, and the stack opening itself enlarge, it is necessary to increase the air and fuel supply. The air supply will increase itself as these openings enlarge and lower the back pressure on the blower. The fuel must be increased, and not necessarily in the same proportion, in order to maintain the proper ratio. A competent operator can make this adjustment easier by slightly opening one valve than by balancing two or more together.

Figure 4 shows a typical daily melt record. The figures shown are an average of those obtained by several furnace users in addition to our own. The performances shown are from furnaces operated correctly and properly maintained, and they are obtainable only under such conditions. Note the increased efficiency with increasing number of heats. Once the furnace has reached thermal equilibrium, melting is extremely rapid. Indeed, care must be taken to not superheat the metal above the desired pouring temperature.

Use Standard Refractory Shapes

The refractories used are standard shapes insofar as is possible and compatible with good performance and simplicity of design. Only the baffle block is a special shape. The lid tile and the stack lids are standard tile dimensions with leading firebrick manufacturers. Insulation used is the castable type which can be mixed and poured wherever required. The furnace design allows ready accessibility to the furnace interior for inspection and maintenance of the lining.

Recommended practice is to pull the lids and patch the lining, and inspect the burner port and tap hole once each week on iron furnaces, and every two weeks on non-ferrous furnaces. Figure 5 shows what may be expected in the way of refractory life with a good operation. If an exceptionally good operation and maintenance schedule are strictly adhered to, these figures will be bettered considerably. Only the stack cover or lid brick are considered as expendable and short-lived. Due to abrasion from the exhaust gases and charge material, thermal shock, and mechanical shock of both charging and opening and closing, these brick could hardly be expected to have an extremely long life.

Life of the tile on the stack front and hearth lid is exceptionally good, and life of the baffle in pounds of metal melted per dollar expended has been greatly increased to date. A leading refractory manufacturer is conducting extensive research toward further increasing this life. If real care is exercised in maintaining the lining, the insulation lining should last indefinitely.

As in the cupola, the melting zone—in this case the throat area—requires the most attention. Particular care must be given this zone, for it is here that the real work of the furnace is performed. It may be well to mention that even though this area is greatly enlarged melting will proceed at almost a normal rate, particularly at the first part of the cycle. It is in heating to pouring temperature that the critical nature of these dimensions becomes apparent. The choke here acts to hold the flame and heat inside the hearth after the metal is molten. If the opening beneath the baffle exceeds 9 in. it will be readily noted that the last part of the charge melts much slower, and superheating is all but impossible.

Suggest First Quality Firebrick

We have found that the fairly good life and the ready availability of first quality firebrick combine to make them competitive with other more expensive and less readily obtainable refractories. In some cases, where extreme temperatures are desired, it is more economical to use the super refractories. Those being used with good results are some grades of alundum, mullite, sillimanite, and magnesite, both brick and monolithic. In non-ferrous furnaces, some users have installed silicon carbide in the bottom and throat areas. The side walls and stack remain firebrick.

It must be remembered that some refractories, notably magnesite and silicon carbide, have much higher thermal conductivity, and will slow preheating considerably. Actual selection of refractories should be a personal choice, governed by type of metal to be melted, type of maintenance supervision available, and availability of the given material. In the final analysis, it should be remembered that a good maintenance program insures an efficiently operating furnace, which in turn will lower all melting costs.

Certain engineering features should be considered by any foundry considering installation of this type of furnace. By its very nature, the furnace emits considerable heat to the adjacent area, and during melt-down may blow sparks from the stack. The

furnace should therefore be located either in a separate room or in a location where these conditions will not be a hazard to the workmen. This can be an important factor in acclimating the personnel to the unit. Hooding the stack is not always necessary, although in most cases it is preferred. This depends primarily on location of the furnace; a low ceiling or the proximity of combustibles or plant wiring may make it mandatory. Ventilating is generally recommended when melting brasses and bronzes, especially those having higher zinc contents.

Advantages of the Furnace

In iron foundries, the prime advantage of the furnace discussed here is its flexibility. Often, as in the authors' foundry, it is necessary to melt successive heats of entirely different alloys. For example, it is not uncommon for our daily production to include several heats each of ductile iron, high nickel-chromium iron, gray iron and other special alloys, such as nickel-copper (non-ferrous), from the same furnace.

In the jobbing gray iron shop the ultimate factor in considering new equipment is operating costs compared to those of present equipment. Generally speaking, the reverberatory type of furnace finds its place in the small shop which normally takes off a heat only once or twice per week, or which has a daily melt of less than ten tons. In this size shop, costs are generally less with a reverberatory furnace than with a cupola. An added advantage is not having floor space, flasks, boards, etc., tied up while waiting for a heat.

The larger shops can often use this type of furnace to advantage for a profitable job requiring a particular alloy other than their regular iron. Unless such work is in quantities sufficient to keep the entire foundry going, it is not feasible oftentimes to use the cupola. This type of furnace lends itself ideally to such an application, because control of engineering properties is far simpler in a batch-type operation than in a continuous operation.

In non-ferrous production shops, the furnace is especially useful because of its speed and low-cost operation. A very marked labor saving is also effected. There has been much discussion concerning the deleterious effects of melting under a reducing atmosphere, but neither we nor other leading users have been concerned with any problems from this source. As in the iron shop, similar alloys can be melted sucessively without contamination. Completely differing alloys that must meet rigid specifications should not be melted successively without first cleaning out the lining completely.

How to Melt Ferrous Alloys

Inability to obtain sufficient temperature in melting ferrous alloys is usually based on improper operation, poor furnace maintenance, or, more often, both. Temperatures of 2800-2900 F can be obtained by observing the correct procedures for operation and maintenance. The question is: How do we obtain high temperatures, necessary for such alloys as ductile iron, without effecting severe oxidation losses of carbon, silicon, and the other oxidizable elements?

Series	Metal	Heat	Number	Av. Time Heat	Min. Tap Temp. °F	Min. Time/Hr.	Max. Time/Hr.
400	Iron	400 #	15	24 Min.	2700 °	18 Min.	35 Min.
	Bronze	450 #	24	12 Min.	2200 °	10 Min.	25 Min.
550	Iron	550 #	15	23 Min.	2700 °	17 Min.	34 Min.
	Bronze	600 #	25	13 Min.	2200 °	11 Min.	23 Min.
1000	Iron	1000 #	15	24 Min.	2700 °	17 Min.	35 Min.
	Bronze	1150 #	18*-25	15 Min.	2200 °	11 Min.	23 Min.
	* Based on Test Heats						

Fig. 4: Typical Daily Melt Record

Series	Metal	Heats Per Lining	Lining Materials Cost	Manhours to Reline
400	Iron	300	$150.00	20
	Bronze	2000 +	$150.00	20
550	Iron	300	$175.00	22
	Bronze	2000 +	$175.00	22
1000	Iron	300	$250.00	35
	Bronze	2000 +	$250.00	35

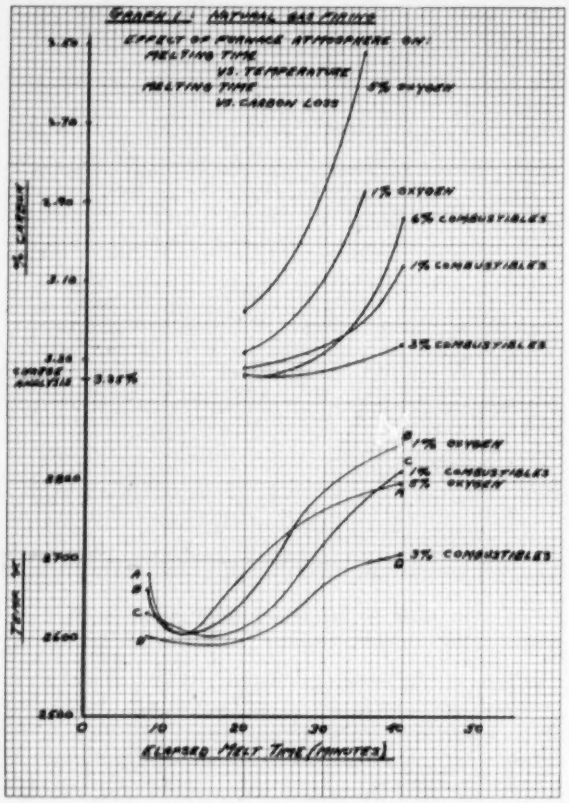
Fig. 5: Refractory Performance

Carbon is the major concern, for no satisfactory method has been found to add carbon to the molten bath, whereas the other elements may be added in any quantity by the addition of ferroalloys in either the charge or the ladle.

This problem is very real and serious. Its consistent solution is the difference between success or failure of the furnace to properly do a melting job. We will therefore discuss the question at length, illustrating the key points graphically. Furnace atmosphere controls rate of oxidation. Throughout this discussion we will speak of an atmosphere as being neutral or as having a specific excess of oxygen or combustibles. These settings are made by using a "heat prover," a sensitive, accurate instrument for measuring any furnace atmosphere.

Melting with natural gas having a heat content of approximately 1000 Btu per cubic foot presents the most difficult case of controlling oxidation losses. Reference to Graph 1 shows that to obtain temperatures of 2800 F or higher the furnace atmosphere may have a maximum excess combustibles content of 1 per cent. An excess combustibles content of 3 per cent would minimize oxidation losses, but would greatly reduce melting rate and make it difficult to obtain temperatures much in excess of 2700 F.

To meet temperature requirements we leave ourselves prone to oxidation losses. At 1 per cent excess combustibles this will not be too great. However, the tendency of the average operator is to melt with a neutral or slightly oxidizing atmosphere. This yields greatly increased efficiency and higher temperatures, but can result in severe oxidation losses. A competent operator can run with a 1 per cent oxidizing atmosphere, and by not allowing excessive superheating to more than 2800 F will be able to keep his carbon loss down to 10 per cent. At 5 per cent excess oxygen, one can anticipate the expected troubles—metal of poor fluidity despite high temperatures and



Graph 1—Natural Gas Firing

an influx of customer complaints because of hard castings.

It is well to note that too great an excess of either oxygen or combustibles will have adverse effects on both temperature and oxidation. In particular the resulting poor combustion of excessive gas will cause marked oxidation because combustion is occurring in the stack rather than in the forehearth, leaving the bath exposed to free, uncombined air. Inasmuch as flame characteristics and differences between a 1 per cent excess combustibles atmosphere and a 1 per cent excess oxygen atmosphere are discernible only to the most practiced eye, the use of a heat prover cannot be too strongly recommended.

Natural Gas Suitable

Natural gas we may then conclude, is suitable for ferrous melting under these circumstances: (1) That temperature requirements do not exceed 2700 F, which is sufficient for almost all gray iron castings, regardless of present practice; (2) If higher temperatures are required, the melting must be under the complete supervision of a competent person who appreciates the oxidation problem.

Propane, butane, and the higher heat content gases offer an answer to the problem. Certain furnace users are melting with these gases; their reactions are varied, and in one instance excellent results have been achieved. Aside from the oxidation question, one must be aware of the explosive nature of these gases, due to the much higher Btu content. In lighting the furnace, particular care must be taken to prevent explosions. Even in using these gases the furnace atmosphere must never be allowed to become oxidizing. By utilizing higher heat content gases a greater excess of combustibles in the furnace atmosphere (3-6 per cent) protects the metal from oxidation, yet higher temperatures may still be obtained.

Why Oil Firing Is Better

Oil-fired melting affords the best means of obtaining temperature and minimizing carbon loss. The reason for this is readily explained by referring again to a study of furnace atmosphere and Graph 2. Using oil we may operate with a furnace atmosphere containing 2-5 per cent excess combustibles and yet obtain any temperature desired. The import of this is readily apparent. With this atmosphere, both temperature and carbon control can be had without the close supervision necessary when melting with gas. In addition flame variations with changes in atmosphere are more easily discernible to the practiced eye.

When using oil, a slightly reducing atmosphere is preferred to an oxidizing atmosphere for both temperature pickup and lesser oxidation. This is apparent from a study of Graph 2. Here again, too great an excess of oil is undesirable. In addition to its adverse effect on temperature and oxidation this unburned fuel will reduce lining life markedly. Generally speaking, any oil which may be atomized properly without preheating is suitable for melting.

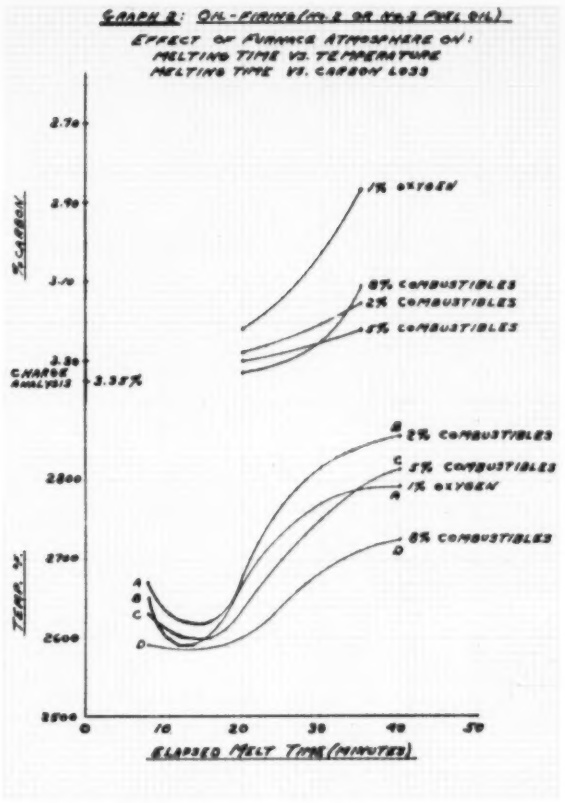
Oil firing is considerably more expensive than gas firing. Some cheaper oils being used are doing a satisfactory job with greatly lower costs. Whether or not a certain oil will melt satisfactorily is usually determined by trial. Over the country numerous trade-name oils are being used, brands originally thought unsuitable; however, in actual use many of them are doing a very excellent job.

Combination-Firing Recent Practice

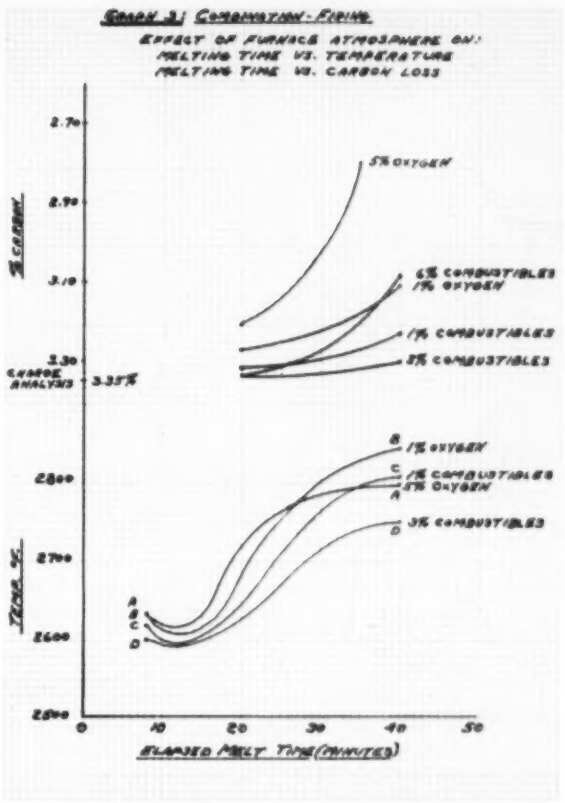
A recently developed practice in our foundry is combination-firing for melting of our irons. In addition to the regular gas consumption shown in Graph 1, we add five gallons of oil per hour to the 400 to 600-lb furnaces and 10 gallons per hour to the 1000-lb units. The reason for this should be evident. In this part of the country gas firing is far more economical than oil firing; therefore, gas is used as much as possible. By utilizing a small oil injection with our normal gas input, we are able to obtain any temperatures required in reasonable times and yet minimize oxidation losses at a minor increase in cost.

Again we can see that the explanation for this is furnace atmosphere. When combination firing, we can first set our furnace at 1-3 per cent excess combustibles with gas alone. The oil injection will increase this to 6-9 per cent excess combustibles, a strongly protective atmosphere, yet capable of yielding high temperatures. Reference to Graph 3 illustrates combination firing and the ideal resulting conditions.

The graphs shown in Graphs 1, 2, and 3, are for cast iron melting. Similar graphs for ductile iron



Graph 2—Oil Firing (No. 2 or 3 Fuel Oil)



Graph 3—Combination Firing

having a charge analysis of 4.00 per cent carbon, and nickel-chromium iron having a charge analysis of 2.75 per cent carbon indicate the same percentage of carbon losses under the furnace atmosphere shown.

What It Boils Down To

Ferrous melting resolves itself into a sound, basic understanding of the furnace and the reverberatory method of melting. This is not complicated, but requires consideration. Gas-fired melting is apparently a simpler operation to most, it is cleaner, and (of greater significance) combustion is not as susceptible to changes in the burner system. But this can create a false feeling of security because of the tendency toward oxidation when firing with gas.

Oil-fired melting, though offering more initial problems in setting up a correct melting practice, when once developed and understood, will give more consistent results without total supervision of the operation. Once established, operating schedules with either gas or oil should be adhered to as rigidly as they are in cupola melting or in any other method of melting. If this is done, there should be a minimum of furnace operational difficulties.

In line with recently developed ideas concerning the relationship of physical properties and machinability, we have found that melting under a reducing atmosphere produces irons having much better machinability, with the same tensile strength and Brinell hardness, as irons melted in a cupola. For example, many of our pump parts are made of a cast iron having the following chemical and physical properties: carbon, 3.00-3.10 per cent; silicon, 2.00-2.20; manganese, 0.50-0.75; phosphorus, 0.20-0.30; sulphur, 0.02-0.10; tensile strength, 35,000-50,000 psi; and Bhn, 217-241.

Many of the castings in question have 3/16-in. sections or less, and are machined on automatics. When melted properly, the castings produced machine readily; only when oxidizing conditions exist in the furnace do we encounter machining difficulties. Actually, the same physical and chemical properties shown above may be had, but with machining possible only at lower feeds and speeds, if melting is done under an oxidizing atmosphere.

Shop talk

Practical Questions and Answers

Phosphorus Removal

We understand there is a material that can be added to a ladle of molten iron to reduce phosphorus. Can you tell us about it?

We are not familiar with the material you have in mind and question its effectiveness. Phosphorus removal requires strong oxidizing conditions to convert the phosphorus to P_2O_5 along with a slag rich in CaO to take up the phosphorus as calcium phosphate. These conditions can be achieved in a basic cupola but we have not heard of any practical instances of dephosphorization in the laddle.

Bot Mixture

Our cupola man would not tell us what he was using in his bot mixture when he left recently. Can you give us your recommendations?

The bot mixture must shape up into a cone that will adhere to the bot stick long enough to plug the taphole safely and completely, should harden quickly to withstand the pressure of the molten metal in the well of the cupola, and yet be sufficiently friable to be readily picked out with a pointed or chisel-ended tapping tool when the next tap is to be made.

Generally, the mixture contains crushed firebrick, ganister, or molding sand plus an amount of fireclay which is determined by experience. For easy removal of the bot, include some 10 to 20 per cent by volume of coke breeze or saw dust. Use a minimum of clay and water, keeping in mind that the higher the clay the greater the shrinkage and the higher the hot strength. Excessive hot strength may make tapping difficult and require the use of a bar and sledge or perhaps an oxygen lance (¼-in. black pipe attached by hose to oxygen cylinder) to open the cupola.

Cables and Slings

What precautions should we take to make sure our cables and slings are safe?

Cables should be examined constantly to prevent kinks and to detect frayed strands and weakening of splices. One frayed strand can cause an accident. Cables, especially those on cranes where they are wound and unwound, should be replaced at frequent intervals, depending on the application. The interval might be a few days in extreme cases and probably should not exceed one year.

It is important that the cable diameter be proper for the diameter of the sheave or pulley on which it is used. Recommended diameters for

continued on page 104

Now, There's an Idea!

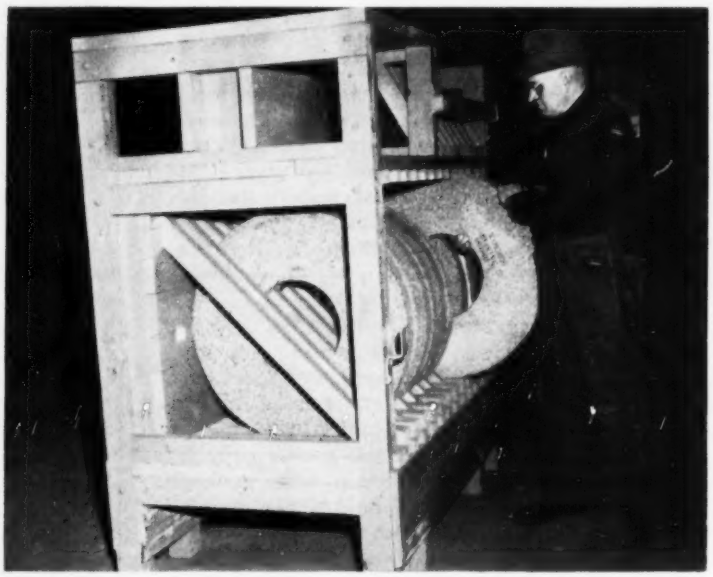
Practical ideas, developed and proved in foundries and pattern shops, are presented in this column. "Now, There's an Idea!" helps *American Foundryman* readers promote the exchange of ideas, the motivating force behind the A.F.S. Contributions for publication are solicited. They may be of any length, preferably short, illustrated by photo or sketch.

Before Campbell, Wyant & Cannon Foundry Co. built a special rack, grinding wheels were transported from receiving room to cleaning room on fork trucks, running risk of possible breakage en route.

Now wheels are unpacked and tested in receiving room, loaded in the rack which is trucked to cleaning room. The individual partitions of the rack protect wheels against shock.

To further insure safety, wheels are tested again when they reach the cleaning room. Testing consists of placing a wheel on a hook and tapping it with a rawhide hammer. A defective wheel makes a flat sound—like a cracked bell. A good wheel rings when struck.

(Item was provided by Robert E. Jagoda, editor, Campbell, Wyant & Cannon Foundry Co.'s *Casting the News*.)



Lyle Wilson, cleaning-room supervisor at the Henry Street plant, Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich., at grinding wheel rack.

news of technical committees

Steel Research

At an April 10 meeting of the Steel Research Committee at the Congress Hotel, Chicago, reports were made by representatives of the several foundries participating in current tests. Committee members reporting were Carl Zilch, Bucyrus Erie Co.; H. H. Blosjo, Minneapolis Electric Steel Castings Co.; John A. Rassenfoss, American Steel Foundries; B. A. Lawson, Harrison Steel Castings Co.; D. C. Zuege, Sivyer Steel Casting Co.; H. A. Young, Crane Co.; and C. G. Faist, Burnside Steel Foundry Co.

It was agreed that the test core should be provided with a pouring box containing a dam to afford an opportunity for the pourer to establish the proper pouring rate while retaining a constant head of metal, thereby achieving a more nearly uniform pouring rate. Following preliminary tests at Harrison Steel Castings Co., the cooperating foundries will then pour another set of test castings, using both the weakest and strongest core mixtures. Green and dry properties of the core sand mixture are to be established by the individual plants. Additional test specimens of each sand mixture will be subjected to high temperature tests by the Harry W. Dietert Co.

Light Metals Research

Chairman W. E. Sicha, Aluminum Co. of America, Chairman of the Light Metals Research Committee, presided over a meeting of the group at Battelle Memorial Institute, Columbus, Ohio, on April 8.

Government participation in the Committee's Research Project was discussed. In order to clarify procedure in this direction, Mr. Hyman Rosenthal, Frankford Arsenal, Philadelphia, attended the meeting and joined in the discussion.

Mr. Rosenthal reported that $15,000 had been allocated for the project for a twelve-month period. This sum cannot be added to the private contract of A.F.S. and Battelle, but will have to be handled under a separate contract. He requested that the present membership of the Committee continue to guide the research program.

The preliminary agreement between the Committee, Mr. Rosenthal, and Battelle provided the following: the government will sponsor research programs; A.F.S. will sponsor films resulting from this research; A.F.S. to retain initial publication rights, following Ordnance Corps authorization; patent rights to be handled as in present contract between A.F.S. and Battelle.

It was concluded that the time for the next meeting of the Committee would depend upon whether Frankford Arsenal signs a contract with Battelle. Such a meeting would be required to outline the future program of the investigation, which would be accelerated by the additional funds that would become available.

Steel Sands

Committee 8-I., Physical Properties of Steel Foundry Sands, convened under the chairmanship of Henry W. Meyer, General Steel Castings Co., Granite City, Ill., at Ithaca, New York, on April 13.

Project work for the 12th annual report was reviewed and demonstrations of the load deformation and expansion tests were carried out during the discussions. The question was raised about the possibility of establishing a common maximum expansion vs. test temperature relationship for silica sands. It was agreed that such standards would eliminate the need for running the expansions on every mixture. This subject was to be investigated further for possible inclusion in the report.

After discussion, it was felt desirable for the committee to prepare an interpretative report on the entire project since its inception in order to place the essential features, especially the practical applications, before the Society membership.

Much discussion centered around sands and mixtures, a subject that will be continued at the next committee meeting in Chicago. The invesigators will continue their study of the silica flour mixes until further decisions are made.

Fracturing Nodular Iron

A288 . . . "Ductibility of Ferritic Nodular Iron," N. J. Gilbert, *BCIRA Journal of Research and Development*, vol. 4, no. 10, February 1953, pp. 458-478.

Ferritic nodular irons of various silicon and phosphorus contents were quenched from various sub-critical temperatures, then impact tested at room temperature. Transition from ductile to brittle fracture was studied by testing irons with and without sub-critical temper-quench treatments. Effects of silicon and phosphorus are reported.

Abstracts

Abstracts below have been prepared by Research Information Service of The John Crerar Library, 86 East Randolph Street, Chicago 1, Ill. For photoduplication of any of the articles abstracted below, write to Photoduplication Service at the above address, identifying articles fully, and enclosing check for prepayment. Each article of ten pages or fraction thereof is $1.40, including postage. Articles over ten pages are an additional $1.40 for each ten pages. A substantial saving is offered by purchase of coupons in advance. For a brochure describing Crerar's library research service, write to Research Information Service.

Practical Casting Design

A286 . . . "Casting Design in Relation to Production," J. H. Pearce and G. D. Whitehouse, *Foundry Trade Journal*, vol. 94, no. 1902, February 12, 1953, pp. 179-185.

Important design features which should be considered by the designer or suggested by the foundryman, in order to facilitate production in the foundry, include elimination of restricted contraction (causes hot tears), padding, coring to avoid isolated heavy sections, proper ribbing, and elimination insofar as possible of abrupt changes of section, sharp corners, etc. Examples of successful design for steel casting production of parts formerly welded, and of good design of steel railroad castings illustrate advantages of the casting process.

New Cupola Charger

A287 . . . "Push-Button Control of Metal Composition Envisaged," *Foundry Trade Journal*, vol. 94, no. 1900, January 29, 1953.

A novel mechanical cupola charger devised by the managing director of Croydon Foundry, Ltd., uses a chain conveyor with pendulum buckets to carry charging stock from ground level to charging door. All buckets pass the battery of cupolas but only those containing the materials desired are tripped automatically to discharge into the proper cupola. Setting of the tripping mechanism is manual at present but will later be operated by remote control from the foundry floor. Each bucket has a spring weighing device.

Among objects of the new system are: to mechanize charging; to make it as automatic as possible; to provide for easy change of composition and control from the foundry floor. Production at Croydon Foundry is approximately 100 tons of castings per week with metal sections from ¼ in. to 8 in.

AJAXOMATIC POURING UNIT

In Operation at Montrose Division,

BENDIX AVIATION CORPORATION

Photo shows installation of AJAXOMATIC Combined Holding Furnace and Automatic Pouring Unit in connection with die casting machine. In circle at right is shown a closer view of the spout from which uniform shots of molten aluminum alloy are ejected at exact time intervals.

NOW completely automatic die casting of aluminum alloys is possible in smaller quantities than formerly and at reduced cost. This fact should be of special interest to the manufacturer who has die casting machines in operation and is doing hand ladling. The unit is entirely sealed, the operator feels no heat, accident hazard is eliminated.

This small, compact AJAXOMATIC* unit will increase production of die castings by as much as 25%, because it delivers regular, uniform quantities of metal into the die casting machine with no delay, immediately after dies are closed. The spout itself is heated and the temperature of each metal shot remains constant.

**Patents Pending*

For further information send for descriptive folder.

AJAX TAMA-WYATT

AJAX ENGINEERING CORP., TRENTON 7, NJ.

INDUCTION MELTING FURNACE

AJAX ELECTRO METALLURGICAL CORP., and Associated Companies
AJAX ELECTROTHERMIC CORP., Ajax Northrup High Frequency Induction Furnaces
AJAX ELECTRIC CO., INC., The Ajax Hultgren Electric Salt Bath Furnace
AJAX ELECTRIC FURNACE CORP., Ajax Wyatt Induction Furnaces for Melting

Iron Library

continued from page 79

Particular attention was paid to the acquisition of famous encyclopedias or works of an encyclopedic nature, since they in many ways represent a measure of the total knowledge in technical and industrial achievement during given periods. Representative works in the Library range from Diderot and D'Alembert to the Encyclopedia Britannica, which closely reflects the scholarship of its age.

The technical journal, which became established as a distinct branch of journalism at the end of the 18th century, and became increasingly specialized in the 19th century, occupies considerable space in the Library. Importance of these journals increases into the present century.

Particular care was bestowed on old Swiss iron mining, iron producing and the general history of iron in Switzerland. The "Helvetica" section contains a copious literature, commencing with the historically important La Tene period and extending to the present day.

The Library's volumes indicate the relative paucity of information on iron in the writings of the ancient world, where references are scattered. Throughout the Middle Ages, little was added to the stock of knowledge concerning iron. The methods used by the iron industry had changed relatively little through the centuries. The knowledge preserved by the monasteries is very scanty in the field of iron literature, being primarily based on pre-Medieval writings.

The Oldest Document

A contemporary copy of a manuscript by Albertus Magnus is the oldest document in the collection. This learned 13th century monk left one of the earliest accounts of a method of hardening steel. Although most medieval manuscripts are in government archives and state libraries, the Iron Library is planning to add photostat copies of such documents as a means of completing its files. An index covering the relevant medieval literature will indicate the location of the most important sources where the Library does not have certified copies. This cross-index will aid researchers and students.

The Iron Library possesses all of the works of Georg Agricola pertaining to natural science, mining and metallurgy, and most of the various editions of *Della Pyrotechnia* by Biringuccio. Both of these writers worked in the middle 16th century.

Original literature on the metallurgy of iron is scantier in the 17th than in the preceding century, largely resulting from a stagnation in the technology and the cultural ravages of the Thirty Years War. Important advances in chemistry and iron working were small in comparison with the following century.

Presents Different Picture

The 18th century presents an entirely different picture. Literature devoted to iron showed an unprecedented burst of activity, with the new methods of exact science and controlled experiment stimulating technology. Reaumur's *Descriptions des Arts et des Métiers* was a milestone in the history of iron literature, the first work of modern times that considered only accurate research techniques. The Iron Library has an extensive file on Reaumur and other writers of the century, including Swedenborg, Rinman, Bergman, Ur, Polhem, and Cronstedt—all distinguished in the annals of metallurgy. Literature from France, Germany, and Austria also occupies a considerable section of the shelves devoted to the 18th century.

The English Industrial Revolution produced a prolific flow of iron literature during the 19th century. British names of the period include Faraday, Bessemer, Nasmyth, Overman, Siemens and David Mushet among others—all represented at Shaffhausen.

A start has been made on a collection of literature of more recent date, dealing with iron production and mining in the United States, Canada, Venezuela, Brazil, North Africa, Australia, and India. The Iron Library, already one of the finest specialized collections on the Continent, is rapidly becoming one of the most unique and interesting institutions of its type in the world.

Shop Talk

continued from page 100

sheaves and drums range from 27 to 72 times the diameter of the cable. In general, use the largest sheave or drum possible; the less flexible the cable, the larger the sheave should be. Thus, for a 6 x 7 cable, tread diameter of the sheave should be 72 times the cable diameter; for an 6 x 37 cable the figure is 27.

Employees should be taught the value of proper care of all cables and slings used throughout the plant and the importance of observing all recommended safety precautions. This procedure should be standard practice.

Screen or Slot Vent

Our pattern shop and core room are arguing about when to use a screen and when to use a slot vent in a core box for blowing cores.

Wherever possible use a screen vent. However, where a scar such as is formed by a screen vent is not permissible or where you want to shape the vent to the contour of the box to get an exceptionally smooth surface, use a slot vent. The slot vent has less than one third the area of the screen vent but it has definite advantages under the conditions noted.

Mechanical Trouble

In setting up a preventive maintenance program, we want to instruct our operators in some of the symptoms of mechanical trouble.

Common indications of mechanical trouble are excessive heat, noise, and vibration. These suggest that you can expect difficulties with faulty bearings, worn or improperly meshing gears, and misaligned shafts. Experienced maintenance men can spot these symptoms.

Leaded Nickel Alloys

Leaded nickel alloy castings which we produce are giving us considerable trouble in heavy sections. We don't seem to be able to riser the castings properly.

The same casting made successfully in leaded red brass can be a real problem in leaded nickel alloy. Chills should be used to control solidification of heavy sections. Because of the higher pouring temperatures of the nickel alloys, the chills must be dry and clean to avoid blowing.

Foundry Safety Studied At Wisconsin Conference

LATEST in the series of A.F.S. foundry safety and health protection conferences was held at the University of Wisconsin March 24 and 25. Sponsored by the Safety & Hygiene & Air Pollution committee, the Educational Committee of the Milwaukee Chapter, and the University of Wisconsin, the conference was attended by foundry engineers, production personnel and safety men. Thirteen papers, plus a panel discussion of individual plant problems on safety and health hazards and prevention, on sand handling, core making and molding, scrap and material handling, melting and pouring, shake-out and core knock-out, cleaning, chipping and grinding were presented at the health and safety conference March 24 and 25 at the University of Wisconsin. Panel leader was J. G. Risney, Risney Foundry Equipment Co. at Wauwatosa, Wis. Members of the panel were Harold B. Zuehlke and Walter F. Scholtz, Allis-Chalmers Manufacturing Co., Charles E. Stull, Pelton Steel Castings Co., Milwaukee, and Eugene Dapp, International Harvester Co., all of Milwaukee.

Mr. Stull brought to the attention of the conferences that, at the same time this conference was in progress, the state legislature of Wisconsin had a committee in session which was investigating working conditions of the foundry industry. Mr. Stull gave some data on his company's control of air pollutants from electric furnaces.

Mr. Zuehlke showed how the average foundry engineer can solve a great many of his own ventilation problems by using simple, easily acquired booklets such as the data sheets distributed by different manufacturers, and the A.F.S. book, *Fundamentals of Design, Construction, Operation and Maintenance of Exhaust Systems.*

Colored Slides Shown

Mr. Scholtz used colored slides to show how several hazardous conditions had been eliminated in Allis-Chalmer's foundries.

Wm. L. Lea of the Wisconsin State Board of Health described a study made of non-ferrous foundries in Wisconsin. He brought out that wherever zinc and tin are used there is some degree of lead hazard.

Dr. O. A. Sander, industrial medical consultant, discussed the silicosis problem and demonstrated that it was not nearly as prevalent today in foundries as it was some years ago. Many so-called silicosis cases awarded claims by the Compensation Board are not silicosis cases and could not have occurred in a foundry. Functional impairment of the lungs does not occur unless the silicosis cases are in very bad stages and that it takes many years to develop a case to this stage, he asserted. Dr. Sander reported that very few silicosis cases are brought to the Compensation Board in Wisconsin from the foundry industry, and that the foundries can control silicosis by: (1) Pre-employment and periodic examinations; (2) proper selection and placement of employees, and (3) employing and keeping foundrymen in foundry work when they have only a minimal amount of silicosis.

Dr. J. W. G. Hannon, McIntyre Foundation, Washington, Pa., brought out the fact that dust particles must be below one micron in size in order to enter the lung. This dust must contain silica in order to develop the silicotic nodules in the lungs, he explained. He also pointed out that the functions of the lungs are gradually impaired with advancement of age, regardless of possible exposure to silica dust.

Dr. Hannon advised the conferences that when cases of silicosis are detected, assurance should be given the patient that he has not contracted an incurable disease. Many employees have built up the fear that silicosis is incurable, similar to cancer. This is not the case and this psychological fear should be allayed by the medical and personnel people in the foundry at every opportunity.

Dr. Lea demonstrates electric precipitator. Watching (l. to r.) are W. N. Davis, Gene Dapp, Dr. O. A. Sander, John R. Bach, Dr. Hannon, James Deacon.

Dust Control

John M. Kane, American Air Filter Co., Louisville, Ky., gave his listeners a background on the application and the effectiveness of dust control equipment inside the foundry, and discussed air pollution and its control outside the foundry. He gave many practical methods of designing hoods and equipment for this purpose.

J. Q. Ames, Universal Foundry of

Whose Business Is Safety?

Three men seriously burned . . . eight furnaces down 7 hours . . . plant production stopped . . . material in process wasted . . . the result of a recent accident in an aluminum foundry. The accident was so easy to avoid. It never could have happened in your shop . . . could it?

The experimental engineer, the metallurgist, and the foundry superintendent were working on a new alloying method, using a gas-fired furnace containing 750 pounds of metal. Ready to pour off, the superintendent told the helper to bring up the ladle. He brought up one not intended to be used. Too cool and evidently wet, the ladle exploded soon after the molten metal started to run into it.

Who was at fault in this accident? Was it the superintendent, the foreman, or the helper? Or could it have been lack of job training in safety? Was it lack of information, carelessness, insufficient supervision?

A simple safety training program would have avoided this accident. *Safety is everyone's business!*

Oshkosh, Wis., discussed his company's housekeeping program, giving many hints on how to handle material to eliminate accident hazards and help production. William N. Davis, A.F.S. safety, hygiene, and air pollution director, discussed the responsibility that supervisors have for maintaining safety practices, and told how an extensive supervisors training program can be easily carried out.

Dr. E. H. Westland of the American Optometric Association, quoting an old baseball expression, said "if you can't see them, you can't hit them." However, he pointed out, what you can't see can hurt you. He described studies made in industrial plants, including foundries, in which 30 to 40 per cent of the employees were below par visually. He told how to get employees who complain that safety goggles give them headaches, that they cloud over and steam, or that safety goggles are hot, heavy, and uncomfortable, to wear while working.

Raymond Bonneau, Inland Steel Co. used electrical display boards to show how low voltage current can be dangerous, the importance of locking out switches, the danger of overfusing, and the necessity of properly grounding electric equipment.

Driving and Cobalt 60

Eugene Dapp showed a new film produced by International Harvester Co. depicting a day in court—a good lesson in highway and driving safety. George J. Barker described the use of cobalt 60 for radiographic inspection of castings. He demonstrated ways to avoid hazards in handling this material recommending that each employee handling or working with cobalt 60 be equipped with a film-detecting badge.

W. S. Walters, LaGrange Shell Molders, Inc., LaGrange, Ind., sent in his paper which pointed out that all hazards connected with the shell molding could be controlled by safe operating practices and procedures.

Dr. Meyer Fox, Mt. Sinai Hospital, Milwaukee, brought out that everyone connected with the foundry—labor, management, medical, engineering and allied professions—has an interest in the foundry noise problem. He stated that standards and legislation covering this problem will be forth-coming, and that by cooperative efforts of all parties involved, present confusion can be eliminated.

Safety Posters Directory

Funny scenes and comic mice, or serious thoughts and sound advice—one can take his choice from the National Safety Council's new 1953 Directory of Occupational Safety Posters containing 756 miniature illustrations of colorful visual salesmen of safety.

The 72-page directory contains advice to safety men on how to choose and use posters effectively. A detailed index makes it easy to locate all posters on a particular subject.

For free copy of the directory and a price schedule of posters, write the National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.

Compressed Air Guide

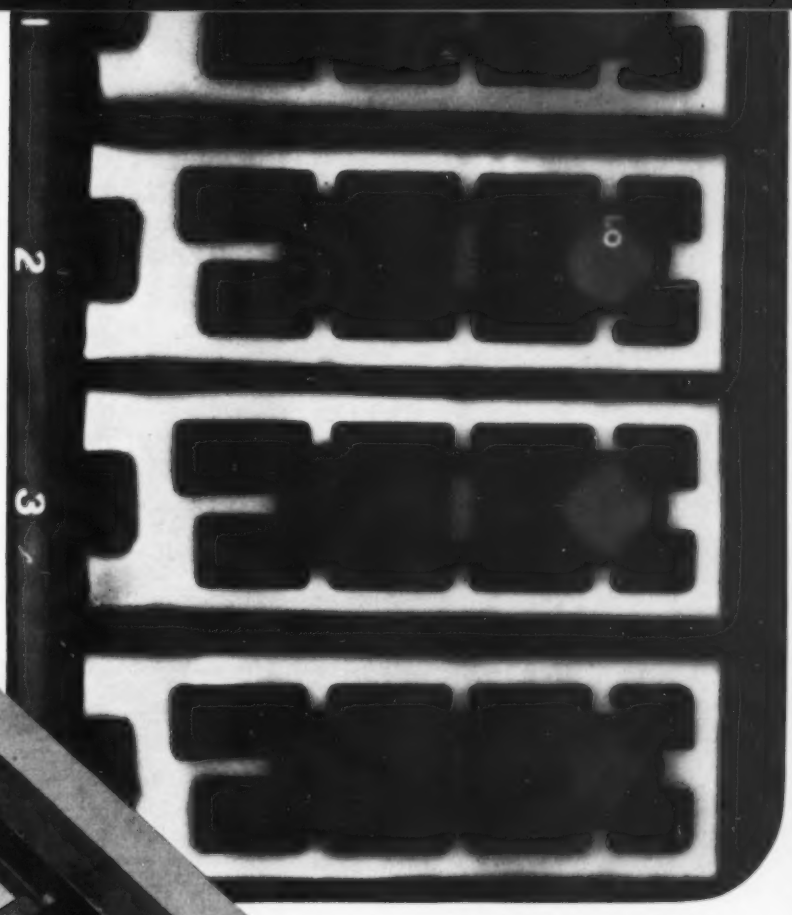
Directed to designers, engineers and production men in industrial plants, a 36-page booklet entitled *Compressed Air Power in Industrial Production* has just been released.

Text deals comprehensively with design and installation of pneumatic equipment, discussing such subjects as actuation by air cylinders, agitation of liquids, blast cleaning, chipping and scaling, clamping, drilling, forging, grinding, hoisting, molding and die casting, ramming, and many others. Text is supplemented by 13 tables.

Punched for insertion into standard 3-ring binders, 8-½ by 11-in. pamphlet is available at 25 cents per copy. Order from Compressed Air and Gas Institute, 1410 Terminal Tower, Cleveland 13, Ohio.

Prof. George J. Barker shows Claude F. Gehant, Chief Engr., National Malleable & Steel Castings Co., Melrose, Ill.; C. W. Jensen, Vice Pres., Kendrick Mfg. Co., Detroit; and Prof. Shorey how sensitive detecting devices are for use with cobalt 60.

RADIOGRAPHY prevents waste



Radiograph of an iron casting for a reciprocating ram.

when a $2 casting gets a $375 treatment

This is a casting for a reciprocating ram. It is to be machined and hand scraped to a final flatness of less than .0001 inch. Should porosity show up during machining, the cost of work done and heat treatment is wasted. The part must be scrapped, not scraped.

But radiography avoids that. By x-raying every casting, flaws are discovered before work is started . . . before hundreds of dollars have been invested in machining and heat-treating costs.

This is another example of the savings possible through radiography.

If you'd like to be sure all your castings are sound—if you'd like to know ways to improve yield in production runs—get in touch with your x-ray dealer. He'll gladly talk it over. Or, if you like, write us for a free copy of "Radiography as a Foundry Tool."

EASTMAN KODAK COMPANY
X-ray Division, Rochester 4, N. Y.

Radiography . . .

another important function of photography

Kodak
TRADE-MARK

Production Developments and Salesmanship Featured at Market Development Conference

■ The Malleable Founders' Society held its fourth annual Market Development Conference April 9 and 10 at Illinois Institute of Technology and the Conrad Hilton Hotel in Chicago. Planned to refresh malleable founders' memories on the advantages of the casting process and on recent technical developments, the conference showed how these could be used advantageously in castings sales and also brought out sales techniques. T. A. Scanlan, Eastern Malleable Iron Co., Newburgh, N. Y., presided throughout the two-day meeting.

The conference opened with a welcome from J. T. Rettaliata, president of IIT, who pointed out that industry is suffering and will continue to suffer from a shortage of engineers for some years.

MFS President F. D. Brisse, Laconia Malleable Iron Co., Laconia, N. H., described his experiences with shell molding and urged consideration of the process as a means of increasing casting business by bringing it in from the field of currently non-cast products. He suggested that conversions to shell molding be sought in components which now require extensive machining.

People who specify materials are not adequately informed on properties and applications of malleable, H. R. Clauser, *Materials & Methods*, New York, told the conference. Users want information on end uses and properties, he said, in complimenting MFS on its movie, *"This Moving World,"* and its publications.

B. Franklin Bills, B. Franklin Bills & Associates, Chicago, outlined the fundamentals of salesmanship, rating buyers as normal, professional, intellectual, emotional, sophisticated, and negative, in their reaction to a product. People don't remain in the same category in all situations, he pointed out, in discussing the salesman's handling of a prospect.

Shell Molding Panel

Following lunch, there was a shell molding panel with three speakers and a film, *"Mechanical Equipment for Shell Molding,"* produced by Mechanical Handling Systems, Inc., Detroit.

Bernard N. Ames, New York Naval Shipyard, Brooklyn, described briefly the establishment of a shell molding department, pointing out that the process is not a panacea for the problems of green sand mold production. He said that 99 per cent of the inquiries made by customers regarding shell molding of castings relate to castings that should not be made in shells. In deciding on production in shell molds, he asserted, the criteria include savings in the cleaning room and/or machine shop, and long production runs.

Walter Sokolosky, Monsanto Chemical Co., Springfield, Mass., said shell molding could be considered an inexpensive way of making dry-sand molds, adding that some castings can be made in shells at the cost of producing them in green sand.

Ray Sutter, Sutter Products Co., Dearborn, Mich., described equipment for shell mold production. L. V. Colwell, University of Michigan, discussed machinability of malleable iron, defining it as a combination of production rate, surface finish, cutting force and energy consumption, chip formation, and ability to stay within dimensional tolerances.

Testing Devices

Look on non-destructive testing devices as aids to improving casting production, not as means of weeding out bad castings, Kermit A. Skeie, Magnaflux Corp., Chicago, advised his listeners in outlining the various non-destructive tests available to industry.

Lyle Jenkins, Wagner Malleable Iron Co., Decatur, Ill., described his company's practice for a 29-hour cycle on pearlitic malleable in a pusher-type, controlled-atmosphere, continuous furnace. The castings are tempered

continued on page 117

Malleable Founders' Society fourth annual Market Development Conference dinner, Chicago, April 9.

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Because Lindberg-Fisher builds *all* kinds of melting equipment . . gas . . oil . . electric . . induction, and carbon arc . . L-F engineers are able to recommend, without prejudice, the proper type of furnace for *your* particular melting requirements.

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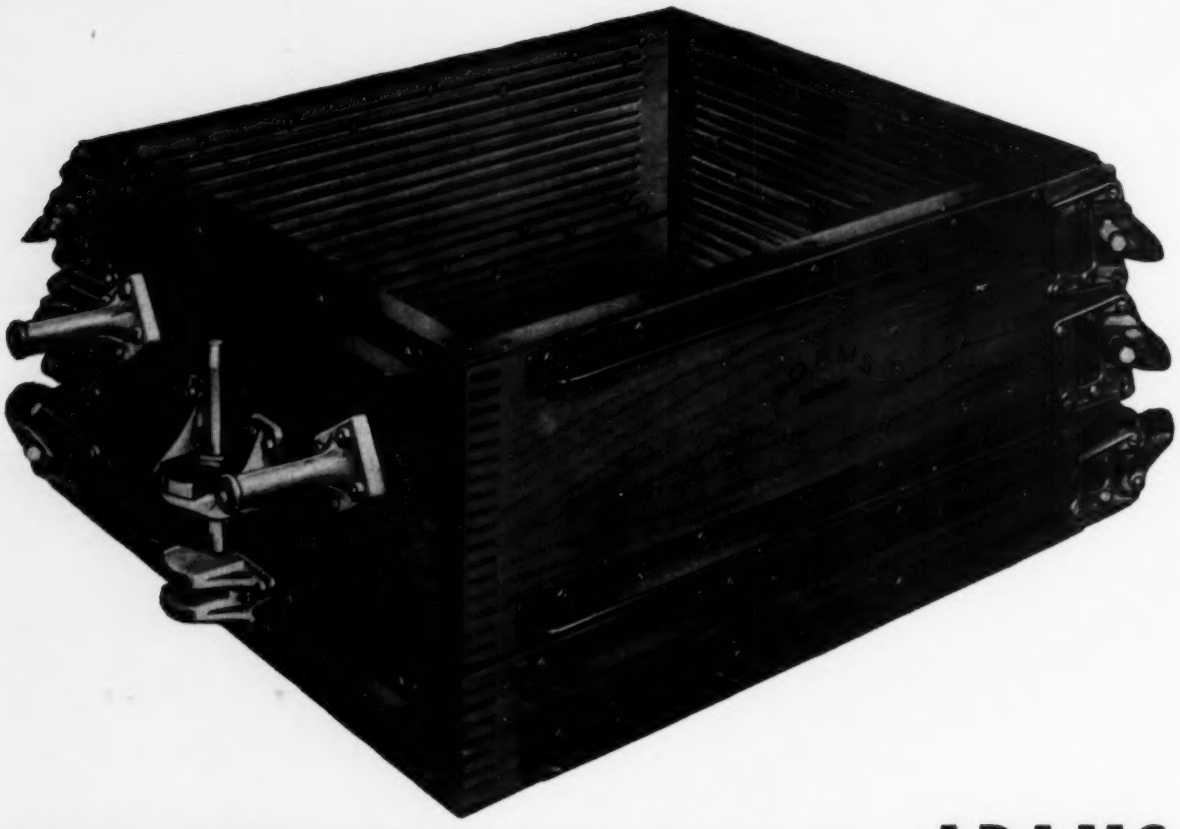

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Adams Cherry Easy-Off Flasks are the key to higher production. Machine Cope and Drag Combinations or floor moulding, air or hand rammed.

FINEST DESIGN — BUILT FOR LONG LIFE AND ROUGH USAGE

Top quality materials. Finest cherry available, carefully selected and thoroughly dried. Corners are machine dovetailed and maintained in rigidness through glueing and machine locking. Malleable trimmings are used where necessary. Handles and pin and ear bases are of aluminum. Hardened and ground hard chrome plated pins with round and elongated bushings. Note tee iron trusses. Steel wear strips are standard at top of cope, bottom of drag and at parting.

Operating mechanisms feature ease of operation with single point adjustment and simple part replacement. Positive lock during jolting or squeezing. Pin and ear arrangements of all types available. You may interchange with your present pattern plate equipment. (Specify pin centers). Standard taper is 5 degrees. Other tapers at no extra charge. Look to Adams for all your foundry equipment and you're aiming at top production with the finest equipment.

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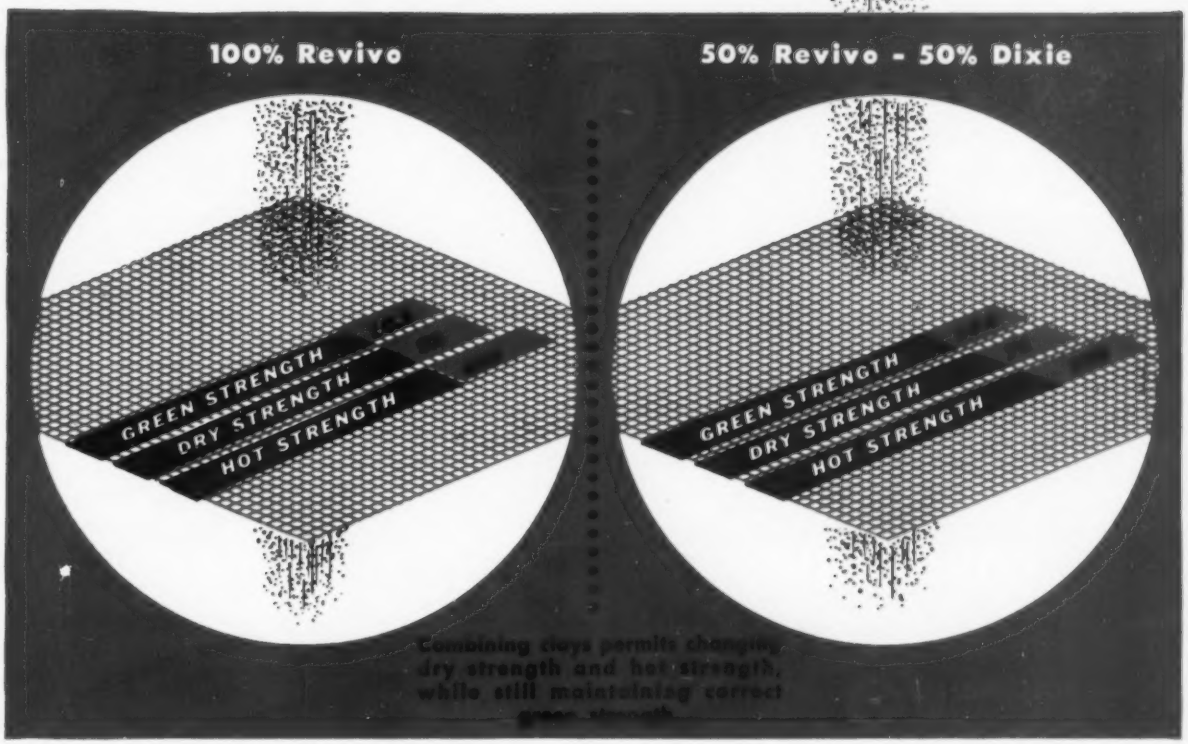
DUBUQUE, IOWA, U.S.A.

MOLDING MACHINES and FLASK EQUIPMENT

REVIVO BOND and its combinations

help increase your foundry yield



Correct combinations of quality clays reduce scrap and increase yield

Because Revivo is the most durable bond clay marketed to foundrymen today, it is an ideal base for combination with Black Hills Bentonite and/or Dixie Bond. Because Revivo has the highest strength of all the fire clay binders, you require less of it and yet obtain maximum permeability. Its high purity and maximum refractoriness reduce sand defects. . . In short, rely on Revivo to give you maximum durability, minimum scrap and maximum *yield*.

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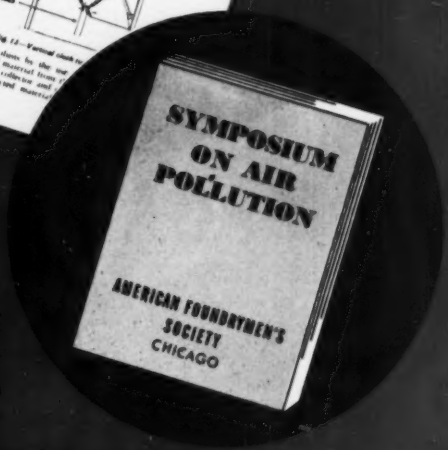
THE FUTURE OF YOUR PLANT

Depends

ON GOOD WORKING CONDITIONS

. . . and the A.F.S. SYMPOSIUM ON AIR POLLUTION, comprised of papers presented at Safety, Hygiene and Air Pollution sessions during the International Foundry Congress, approaches the problems of air pollution in relation to foundry progress.

APP. 1/3 SIZE



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4 DIVERSIFIED, well-illustrated papers are included in this authoritative collection:

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"Specify STEVENS FOUNDRY FACINGS!"

is a remark that means much more than an order for quality materials. It means high calibre castings!

Here at Stevens we are, of course, geared to meet the daily requirements of our customers. That, however, isn't enough. There must be a continual inquiry, by skilled Stevens technicians, into ways and means for improvement of our products and services. We call this technique *Research, Development and Control.* It works . . . for us . . . and for you.

Why not take advantage of our vast experience and modern facilities today? Your nearby Stevens Representative is available for immediate consultation or you may write us direct, without obligation.

PLUMBAGOS

High heat resistance. Smoother casting surface. Castings clean easier. Easy to apply. Make shakeout faster and easier.

CORE PASTES

Have good "green grab"—high tensile strength. Will not boil or swell out of joints. A grade for every purpose.

LIQUID PARTING

Economical—gives 20 to 60 molds per application. Eliminates dust from molding areas. Ideal for patterns for plaster molds—for match plates, loose patterns or core boxes.

CORE AND MOLD WASHES

Mix easily with water. Stay in suspension. Adhere firmly. Smooth, uniform coverage. Can be applied by brush, spray or dip. Reduce metal penetration. Easy, clean peel of sand from castings.

DRY PARTINGS

Safe to use. Economical. Make pattern lifts easier. Part sand cleanly from sand or pattern. Completely waterproofed.

MUDDING COMPOUNDS

Feed easily under thumb or fingers. Will not crumble or roll up. Will not curl under heat. Will not shrink, crack or peel. Prevents fins at joints.

PITCH CORE COMPOUNDS

Reduce cost three ways—cut down amount of new core sand used; allow use of old, burnt sand and gangway sweepings; reduce amount of compound used in proportion to the amount of reclaimed sand.

SEACOAL

Uniform grain size—jet black. Gives cleaner, smoother castings, easier shakeout. A grade for every purpose.

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EVERYTHING FOR A FOUNDRY

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News from Britain

British Institute's Fiftieth Conference in June

The Institute of British Foundrymen will hold its 50th annual conference at Blackpool, June 16 to 19, 1953. The meeting is being organized and sponsored by the Lancashire branch of the Institute.

Mr. E. Longden, a past-president of the host branch, will be installed as president of the Institute at the annual business and general meeting on the second day of the Conference.

Although Blackpool is not itself an industrial center, it has been selected for the meeting because of its fine hotel accommodations, and because visits to important engineering works and foundries were easily made available from that location.

All of the conference meetings and most of the social functions will be held at the Winter Gardens, although council and committee meetings and certain of the ladies' functions will be held at the Imperial Hotel.

Preprints of papers to be presented to the conference will be available to anyone requesting copies from the secretaries. The Institute requests that anyone planning to attend return application forms as soon as possible, and no later than May 23 to the Institute's office in Manchester.

Here is a partial program for the conference:

Tues., June 16. *Afternoon.* Council and committee meetings at Imperial Hotel. *Evening.* Reception by the Mayor and Mayoress of Blackpool.

Wed., June 17. *Morning.* General meeting; presentation of awards. Presidential address. Edward Williams lecture: "Aspects of Nuclear Fission of Interest to Foundrymen and Metallurgists," by E. W. Colbeck, M.A. *Afternoon.* Technical sessions in Winter Gardens. *Evening.* President's reception; annual banquet.

Thurs., June 18. *Morning.* Technical sessions to 12:30 p.m. *Afternoon.* Technical sessions to 5 p.m. *Evening.* Entertainment at Tower Circus, Royal Pavilion, or Palace Variety Theatre.

Friday, June 19. Plant visits.

New Name for British Assn.

Early in 1953, the British Steel Castings Research Association was organized from its predecessor, the Research & Development Division of the British Steel Founders' Association. The new group is entirely autonomous and will function in the field of steel castings research. It is financed solely by member firms, to whom its technical reports and other papers are issued on a confidential basis.

BSCRA has a permanent research staff that is conducting important work in its own laboratories, and in conjunction with many commercial and industrial concerns. The association also sponsors projects in several British universities.

During the past three years, the association research program has ranged over a wide field of steel casting science and foundry technology including an important series related to industrial health and to foundry dust suppression.

National Foundry College

The Board of Governors of the National Foundry College have recently announced that new buildings for the institution will be ready for occupancy by September of this year. The College has been using limited accommodations provided by the Wolverhampton and Staffordshire College since 1948.

A fund of £60,000 was sanctioned last year for this purpose by the Ministry of Education. This sum is now being used in erecting a three-story building comprising a model foundry, several laboratories, classrooms, and other necessary accommodations. A further sum of £35,000 will be required to provide the necessary equipment for the laboratories and school rooms.

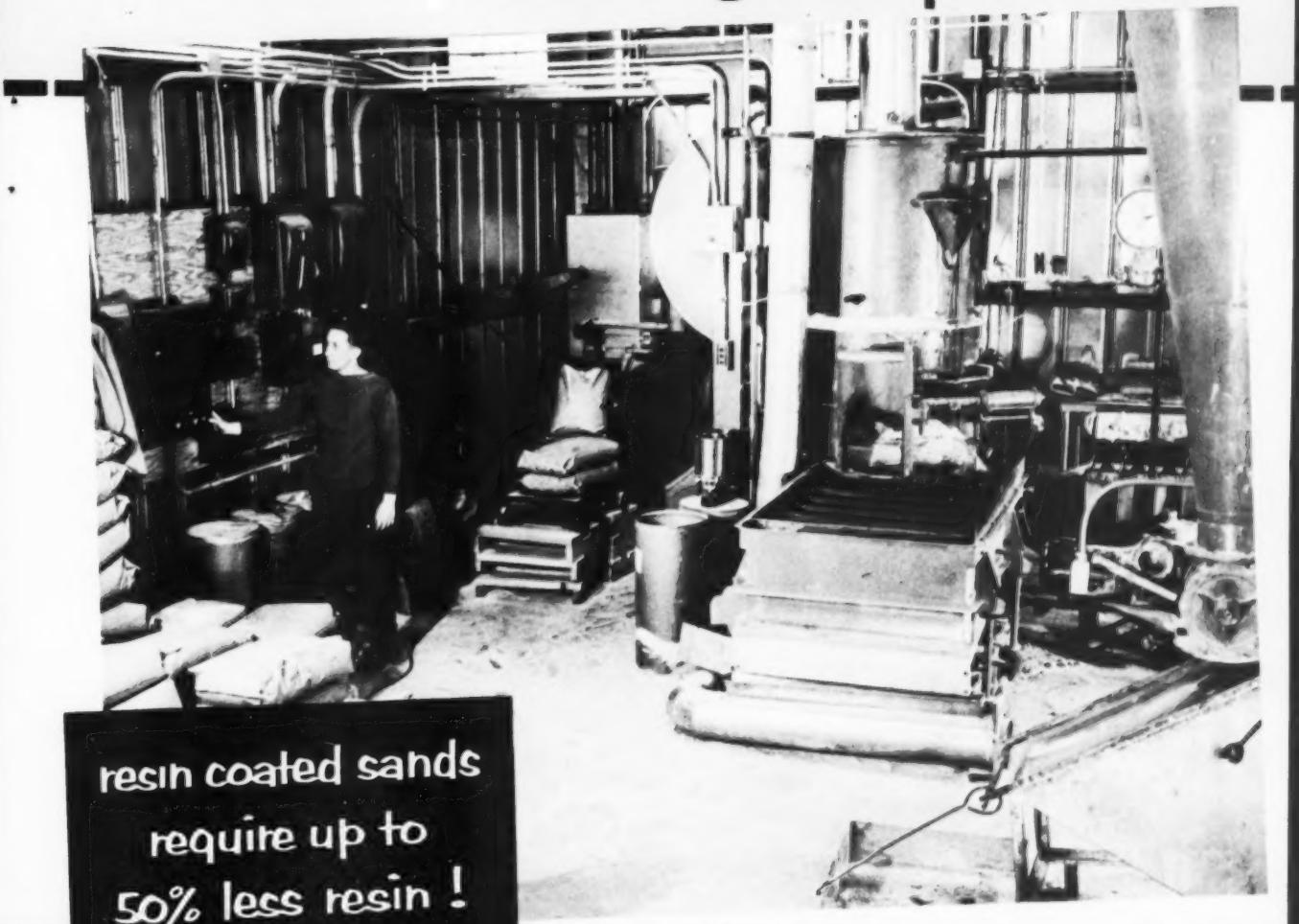
The Ministry will ask the British foundry industry to actively support the school, which was founded to train future technicians and executives for this field. Industry will be asked to subscribe at least £10,000 of the amount needed to equip the new facilities of the College. The Ministry will provide the balance. The Governors have proposed that a permanent tablet be set up near the main entrance to the new building to acknowledge support given to the institution by the foundry industry.

Dadswell Visits A.F.S.

Cyril J. Dadswell, President, Institute of British Foundrymen, and President, English Steels, Ltd., was a recent visitor to the U. S. During his stay, Mr. Dadswell met with A.F.S. Secretary William W. Maloney to discuss plans that the IBF is formulating for American visitors to the International Foundry Congress in Paris this fall. Among the plants to be visited will be English Steels and the National Foundry College sponsored by IBF, while the American foundrymen are in the British Isles.

SHELL MOLDING SAND

Actually coated with resin by new process!



resin coated sands require up to 50% less resin !

Using a newly developed liquid resin instead of powdered resins, Beardsley & Piper engineers have perfected *the Special Speedmullor for the process of actually coating the sand grains with resin during mulling.* Because the resin is perfectly distributed through the sand in a uniform coating around the sand grains, up to 50% less resin is required for equal tensile strengths. Strength, permeability, and melting point are precisely controlled.

Resin coated sands are not dusty and, therefore, a health and safety hazard is eliminated. Coated sands may be handled with ease, with no danger of partial polymerization during storage. Since the resin actually coats the sand, there can be no resin segregation during storage or usage.

This new process is made possible by the design features of the Special Speedmullor. If you are interested in shell molding, you'll want information on the Special Speedmullor, resin coated sand process. Sand samples are available.

FOR FULL INFORMATION,
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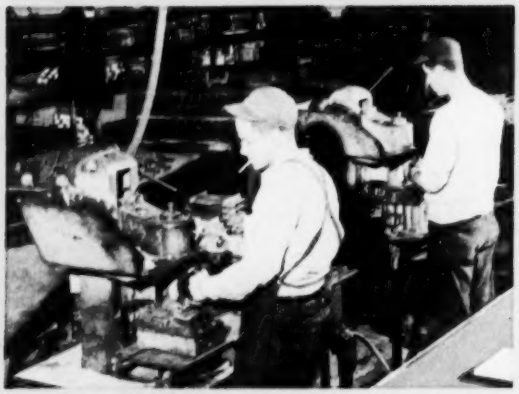
FOR BETTER METHODS

MEMBER FEMA

Champion Core Blowers Set Production Pace In Jobbing Foundry



Close-up of CB-5 Core Blowers shows blowing of two-pound block core for an automotive water pump body.

The major portion of Midwest Foundry's cores are blown on this line of five Champion CB-10 Core Blowers. In the foreground on the conveyor belt are slab cores for automotive clutch rings.

MIDWEST FOUNDRY COMPANY, COLDWATER, MICHIGAN, a jobbing foundry making high grade automotive castings, has greatly increased efficiency of its core room operations with the installation of eight B & P Champion Core Blowers.

The Core Blowers (five are CB-10s and three are CB-5s) are placed on either side of a single conveyor belt carrying cores to the loading station of a vertical, continuous core oven. Typical jobs for the CB-10 Core Blower include automotive clutch ring and power take-off cores.

Let us send you information on the complete line of Champion Core Blowers . . . there's a size to meet your exact needs! *Write to Beardsley & Piper, Division Pettibone Mulliken Corporation, 2424 N. Cicero Ave., Chicago 39, Illinois.*

LOOK TO
BEARDSLEY & PIPER
FOR BETTER METHODS

MEMBER FEMA

Market Conf.

continued from page 108

to customer specifications in gas-fired, recirculating furnaces, he said.

The day ended with the conference dinner and address, "*Much to do About Something*," by James E. Gheen, New York.

Continuing the discussion of pearlitic malleable the second day, H. E. Steinhoff, Wagner Malleable Iron Co., reviewed the growth of pearlitic production in his plant from experimental work in 1951 to 25 per cent of the production in 1953.

L. D. Ryan, MFS managing director, reviewed the metal market, suggesting that on the basis of the Paley report malleable foundry output should be 1,500,000 tons by 1975 if expansion parallels basic steel. Direct mail and advertising are especially important, he pointed out, in reaching people who influence sales but who are not normally contacted by salesmen.

A successful salesman must contribute something more than a knowledge of his product, Walter W. Bronson, Bronson & Townsend Co., New Haven, Conn., said in outlining the makeup of a good malleable salesman.

George T. Boli, Northern Malleable Iron Co., St. Paul, Minn., vice-president of MFS, urged malleable founders to educate prospects through technical and sales engineers.

Tradition has much to do with specifying metals, Harold Brock, Ford Motor Co., Dearborn, Mich., pointed out in urging his listeners to enlighten engineers with more information on properties and applications.

Afternoon discussions led off with a presentation of steps in selling by W. J. MacNeill, Badger Malleable & Mfg. Co., South Milwaukee, Wis. He gave the following steps in his talk "*From Design to Shipments*" (1) Win the buyer's confidence; (2) Use foundry technical know-how to analyze design and examine production method; (3) Make quotation convincing.

Prof. Otto Zmeskal, Illinois Institute of Technology outlined relationships between engineering education and the malleable iron field. Harry G. Walter, U. S. Steel Corp., Chicago, urged the group to prepare for competitive selling.

Following a general discussion of marketing, the conference sessions were concluded with remarks by Frank O. Parker, Dayton Malleable Iron Co., Dayton, Ohio.

During its 51st anniversary meeting at the Edgewater Beach Hotel, Chicago, the Steel Founders' Society of America announced its national medal awards for outstanding leadership in the steel castings industry. Presentation of the awards was made at a special luncheon session, attended by approximately 300 members from all parts of the country.

H. A. Forsberg

G. A. Lillieqvist

J. A. Rassenfoss

A. J. McDonald

C. F. Barchfeld

A. S. Breithaupt

Steel Founders' Society Presents Medal Awards

The society's top national award, the Lorenz Memorial Gold Medal, went to Henning A. Forsberg, vice-president, Continental Foundry & Machine Co., East Chicago, Indiana, who was also society president during 1952. Mr. Forsberg was cited for "outstanding contributions to the industry." He was also formerly president of the National Castings Council.

G. A. Lillieqvist, American Steel Foundries, also of East Chicago, received the society's national Technical and Operating Gold Medal for 1952 because of his valuable technical contributions and "exceptional service in fundamental research." John A. Rassenfoss, also of American Steel Foundries, was awarded the annual Steel Foundry Facts award for excellence of material published in the society's technical literature. His award was based on an exhaustive technical paper, "The Effect of Casting Design and Metallurgical Variables on Hot Tear Occurrence in Steel Castings," published in the society's magazine in March, 1952.

Announcement was also made of the election of A. J. McDonald, vice-president, American Steel Foundries, as president of Steel Founders' Society. Mr. McDonald has been in charge of his company's Washington office, and has worked actively in foundry industry affairs, as related to the national government. As president of the society, he will also serve as chairman of the board of directors, and of the executive, and budget committees.

Other officers elected for 1953 were: Carl F. Barchfeld, Commercial Steel Casting Co., Marion, Ohio, re-elected vice-president; and Arthur S. Breithaupt, Dodge Steel Co., Philadelphia, re-elected as a director and executive committee member to serve with Messrs. McDonald and Barchfeld.

In addition to the executive committee members, others elected to the 1953 society board of directors are: A. T. Carter, Tonawanda Electric Steel Casting Corp., No. Tonawanda, N. Y.; J. M. Kincaid, Jr., Kincaid-Osburn Electric Steel Co., Inc., San Antonio, Tex.; R. A. Wahl, Union Steel Castings Div., Blaw Knox Co., Pittsburgh; A. M. Slichter, Pelton Steel Casting Co., Milwaukee; P. V. Spooner, Missouri Steel Castings Co., Joplin; and W. P. McGervey, Jr., Hanford Foundry Co., San Bernardino, Calif.

Chapter News

This intent foursome attended the April meeting of the Southern California Chapter. They are (l. to r.) Phillip Campbell, Campbell Pattern Works; Henry Howell, Howell Foundry; Harold Pagenkopp, Angelus Pattern Works; and William Baud, Mechanical Foundries Division. Mr. Pagenkopp presided.

Edging closer

Our national membership goal of 11,000 members for A.F.S. in 1953 continues to approach realization. A new high membership total of 10,868 members was reached by March 31, an increase of 47 over the February count. Although the March gain was below that of February, we are now within 132 members of our target. All Membership Chairmen are to be congratulated for the fine and spirited efforts they have made to date. Just a slight push, which should be aided by the National Convention, will put us over the top. Let's get behind the drive to make A.F.S. even more completely representative of the foundry industry.

Wisconsin Chapter

H. W. Schwengel
Modern Equipment Co.

A panel discussion was held by the Gray Iron Section of the Wisconsin Chapter in April. Mrs. Cliff Schwenn, Brillion Iron Works, served as chairman and introduced Prof. Heine, Univ. of Wisconsin, who acted as moderator. The panel consisted of Ed Zick, J. I. Gilson Foundry; L. Koenig, J. I. Case, Racine; E. Wussow, Kaukauna Machine Corp.; F. Kulka, Motor Castings Co.; T. Tanner, Zenith Foundry; and Mr. H. Schwengel, Modern Equipment Co.

The meeting was well attended and there was lively audience participation. This type of panel discussion is becoming increasingly popular in our Chapter.

Southern California

K. F. Sheckler
Calmo Eng. Co.

The regular April meeting of the Southern California Chapter of the American Foundrymen's Society was held on April 10th at the Rodger Young Auditorium in Los Angeles. Following a welcoming address by President Harold Pagenkopp, new members and guests were introduced to the chapter. Bob Ditmore conducted the drawing for the door prizes and called for a big turnout at the Ladies Night Dinner Dance to be held at the Pacific Coast Club in Long Beach on April 17th.

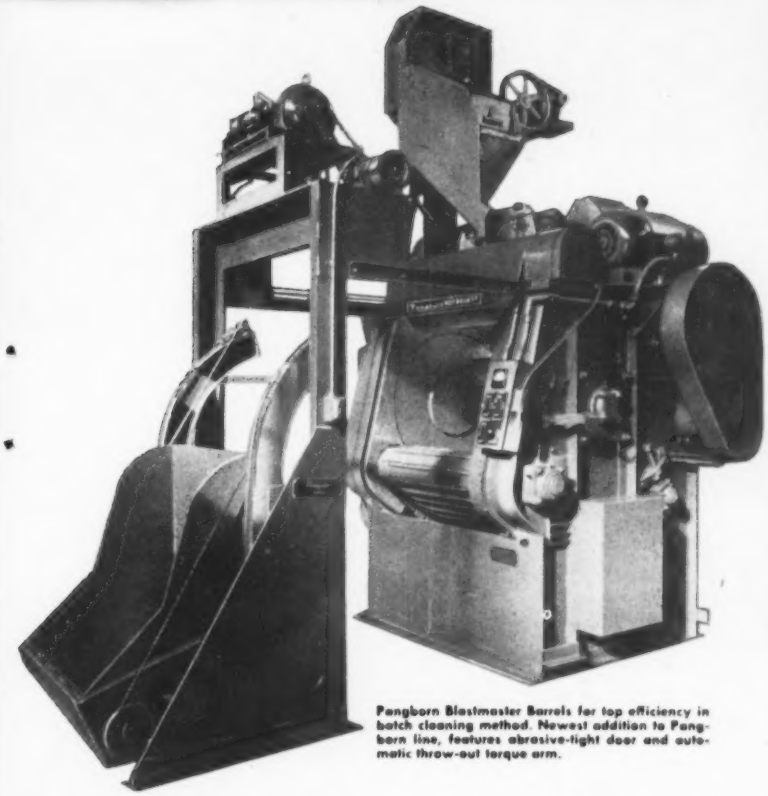
Henry Howell reported the recommendations of the Nominating Committee and the results of the election of officers will be reported after the May meeting. Tony Tuzzolino announced the winners of the Apprentice Moulding Contest as follows: *First Place*— Joseph Lo Patriello, Airesearch Manufacturing Co.; *Second Place*— Charles Gonzales, Airesearch Manufacturing Company; *Third Place*— Gilbert Aguilar, Stanley Foundries. The big surprise of the evening was the announcement that the first and second place winners of the Southern California Contest also took first and second place in the National Contest. Congratulations to the winners and to Tony Tuzzolino, superintendent of Overton Foundry and to Frank Warga, superintendent of the foundry for the Airesearch Manufacturing Company, who worked with these apprentice moulders.

Mr. Phillip Campbell of Campbell Pattern Works, announced the following winners in the Pattern Apprentice Contest: *First Place*—Phil Campbell (second straight win); *Second Place*— Martin Stovich; *Third Place*—Yoshaki Ichito. Congratulations to the winners and many thanks to Bob Hall of Santa Monica Technical School for his assistance. The winners in both the Molding and Pattern Apprentice Contests received prizes and were guests of the chapter for the dinner and meeting.

Harold Chappie introduced Mr.

continued on page 124

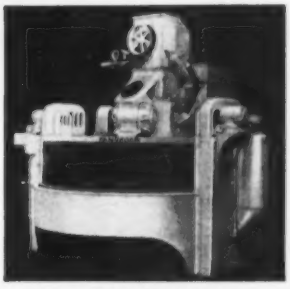
Pictured at Wisconsin Chapter meeting, left photo, from left, C. F. Fuerst, Falk Corp.; J. A. Gitzen, Delta Oil Prods. Co.; and C. M. Lewis, Badger Malleable & Mfg. Co. In right picture, from left, National Director M. A. Fladoes, Sivyer Steel Casting Co.; Past Chapter President G. E. Tisdale, Zenith Foundry; and E. N. Carpenter, Carpenter Bros.



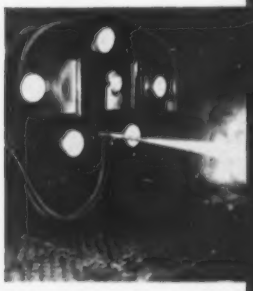
Pangborn Blastmaster Barrels for top efficiency in batch cleaning method. Newest addition to Pangborn line, features abrasive-tight door and automatic throw-out torque arm.

Pangborn ROTOBLAST® Table-Rooms clean castings from a few pounds to 2½ tons. Extremely efficient for jobbing foundries. For all-purpose blast cleaning.

Pangborn Turnstyle Tables allow simultaneous loading and cleaning as one of two tables is always in blast chamber. For general blast cleaning.



Pangborn ROTOBLAST Tables for semi-continuous blast cleaning. Types and sizes for castings of all sizes with deep pockets, intricate shapes, and many surfaces.



Pangborn Hydro - Sand Blast Rooms for simultaneous blast cleaning and core removal. Use high-pressure stream of sand and water operated from outside.

Pangborn Airless ROTOBLAST Rooms for general blast cleaning of extra-large castings. Neither compressed air nor water is necessary. Operated from outside.

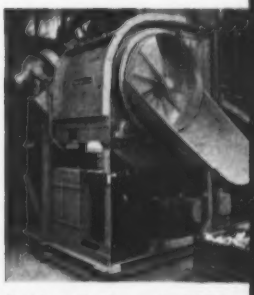
8 Ways Pangborn Saves Industry and You--Time, Labor and Money

Here are just eight of the many types of standard Pangborn Blast Cleaning and Dust Control machines serving industry. For nearly half a century, Pangborn engineers with "know how" have been helping foundries save time, labor and money with these units as well as with specially-designed machines.

These engineers can do the same for *you!* They'll be happy to work closely with you, in recommending the exact Pangborn units you need, and in developing new equipment when necessary. No matter what *you* clean—large or small castings, fragile or intricate molds, or any combination . . . no matter what your dust problem, if dust must be collected at the source . . . it will pay you to find out how Pangborn can help you.

Send for the Pangborn bulletins that fit your needs. Just fill out the coupon below and mail to: PANGBORN CORPORATION, 1300 Pangborn Blvd., Hagerstown, Maryland.

Pangborn special equipment for unusual blast-cleaning problems. Designed only after careful study by Pangborn engineers skilled in such problems.



Pangborn Continuous-Flo ROTOBLAST Barrels for cleaning steady flow of miscellaneous work quickly. Operated by one man on production line basis.

OVER 28,000 PANGBORN MACHINES SERVING INDUSTRY

Pangborn

Look to Pangborn for the latest developments in Dust Control and Blast Cleaning equipment

BLAST CLEANS CHEAPER

with the right equipment for every job

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PANGBORN CORPORATION
1300 Pangborn Boulevard, Hagerstown, Md.

Gentlemen: Please send me the following bulletins:

☐ Tables ☐ Table Rooms ☐ Rooms
☐ Barrels ☐ Continuous-Flo ☐ Dust Control

Name .....

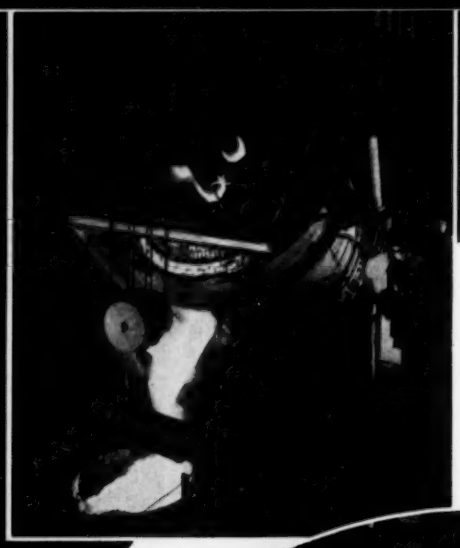
Company .....

Address .....

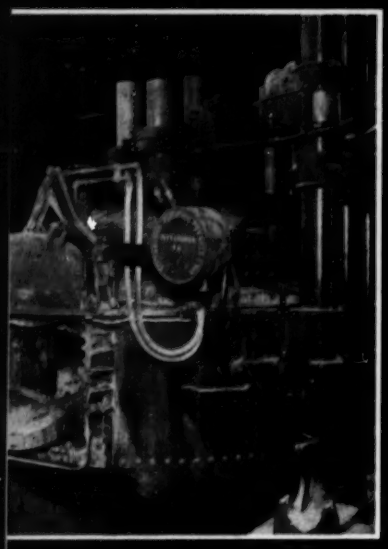
City ..... Zone ..... State .....

HOW standardizes

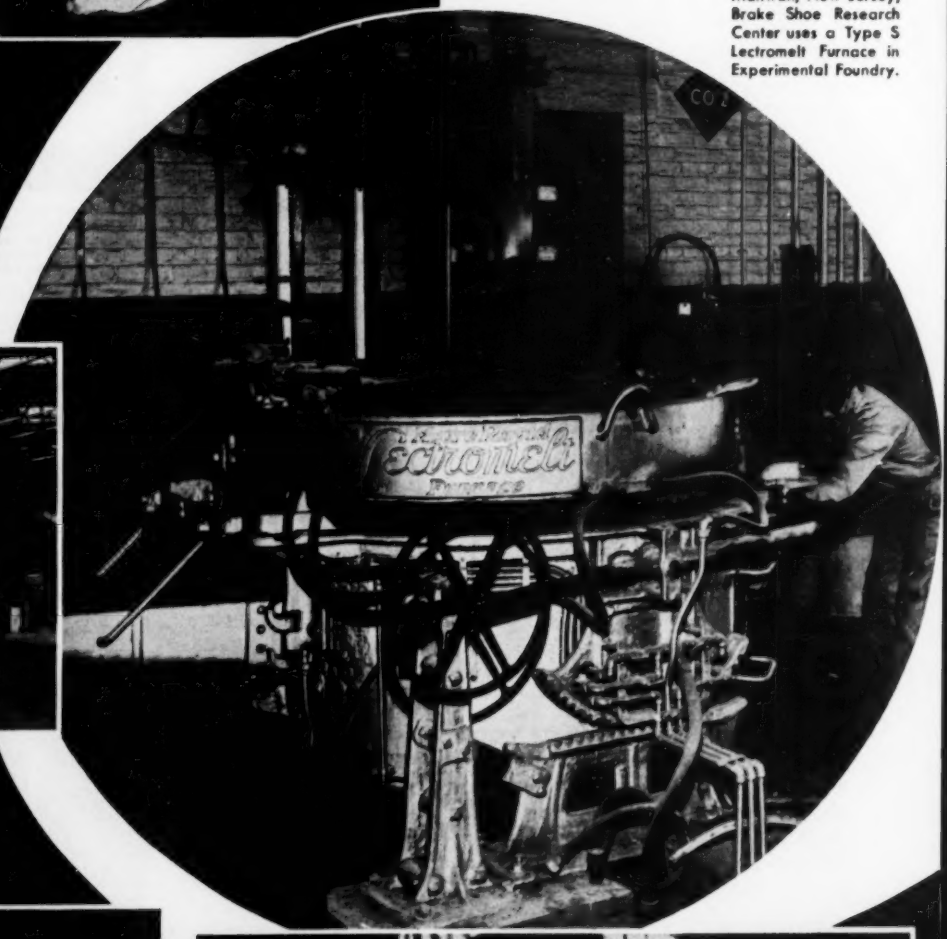
Two OPT Lectromelt Furnaces work constantly at AMSCO Division, Chicago Heights, Illinois.



At New Castle, Delaware, AMSCO Division, a Type Q Lectromelt Furnace.

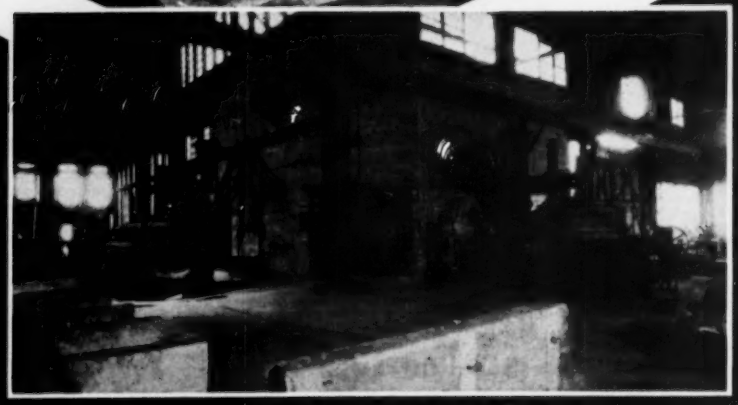


Mahwah, New Jersey, Brake Shoe Research Center uses a Type S Lectromelt Furnace in Experimental Foundry.



Electra-Alloys Division at Elyria, Ohio uses three Lectromelt Furnaces: Types QT, ST and TT.

The AMSCO plant at St. Louis uses two Type Q Lectromelt Furnaces.



There are three Type Q Lectromelt Furnaces in the Denver, Colorado, AMSCO Division

AMERICAN BRAKE SHOE

high grade production

Depend on Lectromelt* Furnaces for research and production

American Brake Shoe tests and proves metal formulae and casting procedures in the Experimental Foundry at their Research Center at Mahwah, N. J. A new cupola, in combination with a two-ton Lectromelt Furnace, provides the close control required for research . . . plus the capacity to test accepted new procedures under actual conditions of production.

After establishing efficient methods for new procedures, they're relayed to the company's many divisions. And the high standards set in the Research Center at Mahwah become the production standards at the plants.

Indicative of the confidence American Brake Shoe places in Lectromelt Furnaces is the extensive use of them in various divisions, as indicated on these pages.

For Catalog No. 8, describing the advantages of Lectromelt Furnaces, write: Pittsburgh Lectromelt Furnace Corporation, 316 32nd Street, Pittsburgh 30, Pennsylvania.

*Reg. U. S. Pat. Off.

Manufactured in . . . CANADA: Lectromelt Furnaces of Canada, Ltd., Toronto 2 . . . ENGLAND: Birlec, Ltd., Birmingham . . . FRANCE: Stein et Roubaix, Paris . . . BELGIUM: S. A. Belge Stein et Roubaix, Bressoux-Liege . . . SPAIN: General Electrica Espanola, Bilbao . . . ITALY: Forni Stein Genoa. JAPAN: Daido Steel Co., Ltd., Nagoya

Even in Canada at Joliette, Quebec, it's Lectromelt, one Type Q and a CQT.

At Los Angeles, the AMSCO Division has three Lectromelt Furnaces: two Type Q's and an S.

WHEN YOU MELT... MOORE RAPID *Lectromelt*

Invest... in A.F.S. Membership

Exhibits at biennial A.F.S. Foundry Show enable Members to inspect latest foundry equipment and supplies.

... if you are looking for profitable and lasting friendships in the foundry industry

... if you recognize the value of being well-informed on the latest foundry techniques and applications

... if you want access to a constant source of help relating to casting and operational problems

... if you want to be an integral part of a group of progressive foundrymen who freely contribute to an exchange of knowledge and experience for personal advancement and industry progress

Membership in A.F.S. . . .

represents an investment in an essential industry . . . actually, job insurance . . . because, through Society service and Society contacts, you endow yourself with a technical knowledge leading to self-development and a better job as an informed employee.

Committee Activities . . .

Over 500 Members serve voluntarily on the many committees of A.F.S. and its Chapters, finding in these activities and associations a worthwhile opportunity to advance themselves, their firms and the industry they represent. A.F.S. welcomes members to Committee Service.

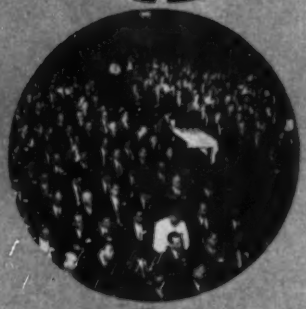
A.F.S. Publications . . .

The dissemination of authoritative information leading to better foundry practice—in other words, better castings through simplified production procedures at minimum cost—and products is another primary function of the American Foundrymen's Society. In line with this thinking, Society publications are constantly developed through A.F.S. Committee projects. Members enjoy special discounts on all book purchases.

American Foundryman . . .

Announcements and reports of all A.F.S. activities regularly appear in AMERICAN FOUNDRYMAN—membership service includes a monthly copy of this technical-practical magazine which is published to assist the American Foundrymen's Society in keeping the industry progressive, so that all branches of the metal castings field can compete with modern thinking in research, design, engineering and production.

Chapter meetings, regional conferences and National Conventions promote friendships . . . invite exchange of ideas.



Authorities in modern foundry practice regularly present the latest information for the benefit of A.F.S. Members.

Recognition of outstanding service and encouragement of youth activities build a stronger, more unified industry.

AMERICAN FOUNDRYMEN'S SOCIETY

616 South Michigan Avenue, Chicago 5, Illinois

" . . . We cut our cleaning room costs between 50 and 60 percent as a result of using Delta GraKoat Wash."

DELTA GRAKOAT CORE AND MOLD WASH

Delta GraKoat Core and Mold Wash speeds production of finer-finished castings.

Delta GraKoat Wash is moisture proof. When thoroughly dried, it will not absorb moisture. It will not precipitate when properly mixed and will stay in suspension indefinitely. It will not deteriorate. It is highly refractory. Molten metal lays on the surface without the least disturbance. It has high fusion and unusually high hot strength. There is no fusion or sinter below 3300° F. The hot strength is over 600 p.s.i. It does not react with molten metal to form gaseous vapors.

Delta GraKoat Wash anchors itself to the surface by penetrating into the sand. This prevents flaking, peeling, and scabbing when in contact with molten metal. It is easy to apply. It can be dipped, sprayed, swabbed, or brushed on either green or dry sand surfaces. Casting surfaces are free from burn-in and metal penetration and require a minimum amount of cleaning.

Delta GraKoat Wash covers a greater surface area and is much more economical to use. It is recommended for gray iron, malleable and non-ferrous castings.

A liberal working sample is available without cost or obligation together with complete instructions for use. Write today.

DELTA

DELTA OIL PRODUCTS CO.

MANUFACTURERS OF SCIENTIFICALLY CONTROLLED FOUNDRY PRODUCTS

MILWAUKEE 9, WISCONSIN

Chapter News

continued from page 118

R. A. Quadt, Director of Research and Development for the Hunter Douglas Corporation at Riverside, California, who spoke on the "Effects of Alloying Elements on Properties of Aluminum Casting Alloys". The discussion was very interesting and informative, especially to the non-ferrous foundrymen in attendance.

Western New York

Mr. William M. Ball, Jr., metallurgist and foundry consultant, R. Lavin & Sons, Inc., Chicago, conducted the non-ferrous round table meeting of the Western New York Chapter on March 6. He was assisted by Bob Forrest, Lakeside Bronze, Inc. Seventeen foundrymen attended the session.

Mr. Ball stated that there are 3,000 types of non-ferrous alloys, which can be sub-divided into eight groups. These categories were further analyzed. Other subjects included furnace atmosphere, and tapping and pouring temperatures. Mr. Ball stressed the use of plug test bars and fracture test bars to determine the condition of the metal before pouring.

Northwestern Pennsylvania

Roy A. Loder
Erie Malleable Iron Co.

The Northwestern Pennsylvania Chapter of the American Foundrymen's Society held one of its most successful Father and Son Nights at the Erie Moose Club, Erie, Pennsylvania.

The evening's speaker, Mr. Richard D. Agresti, a prominent Erie attorney and a Commissioner of Little League baseball, gave a very interesting lecture on the methods of forming leagues, what it does for the boys, and the final Little League World Series. He pointed out that all these boys' activities were sponsored by the local business men and service clubs, and that a call to him from anyone interested in this phase of boy's work would be welcome.

After his brief, but to-the-point discussion, he showed a thirty-minute film of "Little League Games" which was enjoyed by the oldsters as well as the youngsters.

The entertainment committee had also provided a film on "Fishing In Florida" for the oldsters which was loaned to them by the Western Auto Stores of Erie.

Mr. Richard D. Agresti, (center) attorney and Commissioner of Little League Baseball, recently spoke to a Father-Son gathering of the Northwest Pennsylvania Chapter. Charles F. Gottschalk, Cascade Foundry Co., is at left; Fred J. S. Carlson, Weil McLain Co., at right. Meeting was well attended.

A.F.S. National Technical Director S. C. Massari discusses Society activities at National Officers' Luncheon of University of Alabama Student Chapter in February. Seated at speakers' table (l. to r.) James M. Faircloth, Dean, College of Engineering; Mr. Massari; Miles Stephens, Student Chapter Chairman; the late Fred Brown, Chairman, Birmingham Chapter; and L. N. Shannon, President, International Foundry Technical Societies. Session was held at University.

The Chapter held a jurisdictional meeting at Corry, Pa. on April 10th in the Hotel Corry ballroom.

The afternoon was given over to the first plant visitation of the year at the Ajax Iron Works, with approximately fifty members taking part.

This was one of the finest plant tours we have ever seen and Mr. Robert Jordan, foundry superintendent, Ajax Iron Works, and his assistants, did an outstanding job as they took the visitors through their machine shop and foundry in groups of four and six so that every-one could get all the information and explanation that was provided, and it proved very interesting.

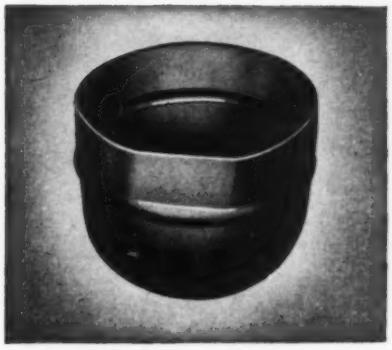
The evening lecture and discussion was carried on by Mr. William H. Sparr of the International Nickel Company whose subject was "Engineering Properties and Applications of Ductile Iron." The lecture was illustrated by many colored slides.

During the discussion which followed the lecture, Mr. Sparr brought out many interesting points in which he described "Ductile Iron" as a new engineering metal and in category of uses fell between Malleable Iron and Gray Iron. It could be cast in heavier sections such as is normally done with Gray Iron and it also has some of the properties of Malleable Iron.

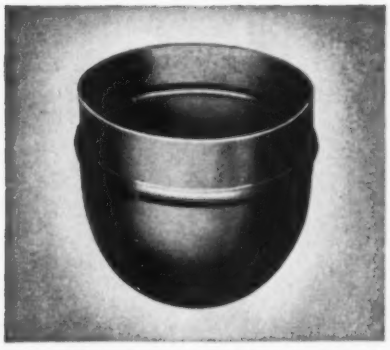
continued on page 130

NO. 1 SOURCE FOR

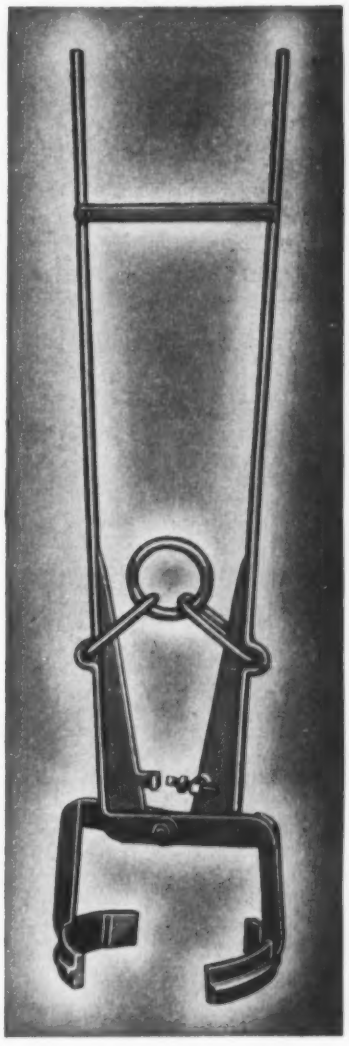
Bowls · Shanks · Tongs



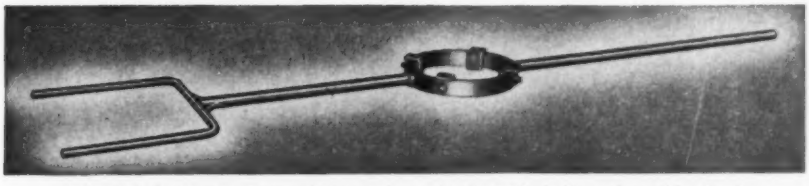
Industrial Equipment round bottom pressed steel ladle bowl, 50 lb. capacity, type 7 flat side.



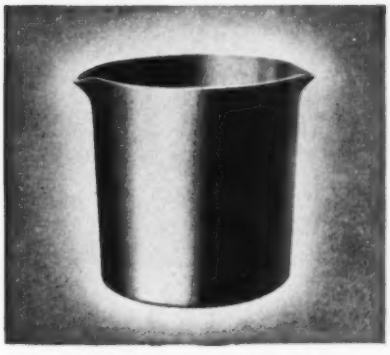
Industrial Equipment round bottom pressed steel ladle bowl, 60 lb. capacity, type 14 circular.



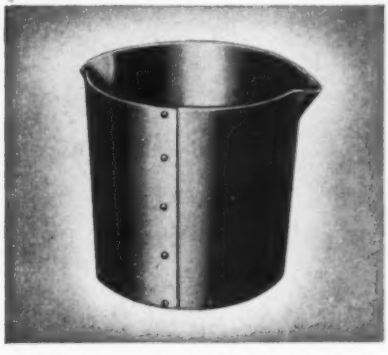
Type 72C crucible tongs. Adjustable. Four-point suspension. Claw types also available.



Industrial Equipment type 30CA single and adjustable ladle and crucible shank. Four-point suspension . . . easily adjustable . . . no springs . . . air cooled band. Fixed band types also available.



Industrial Equipment type 514 flat bottom welded steel ladle bowl. Available in almost any size or thickness.



Industrial Equipment 537 flat bottom riveted steel ladle bowl.

The above Industrial Equipment products, along with dozens of other types of bowls, shanks, tongs and ladles, are included in our latest catalog. *Write for your copy.*

LADLES

SHANKS

BOWLS

TONGS

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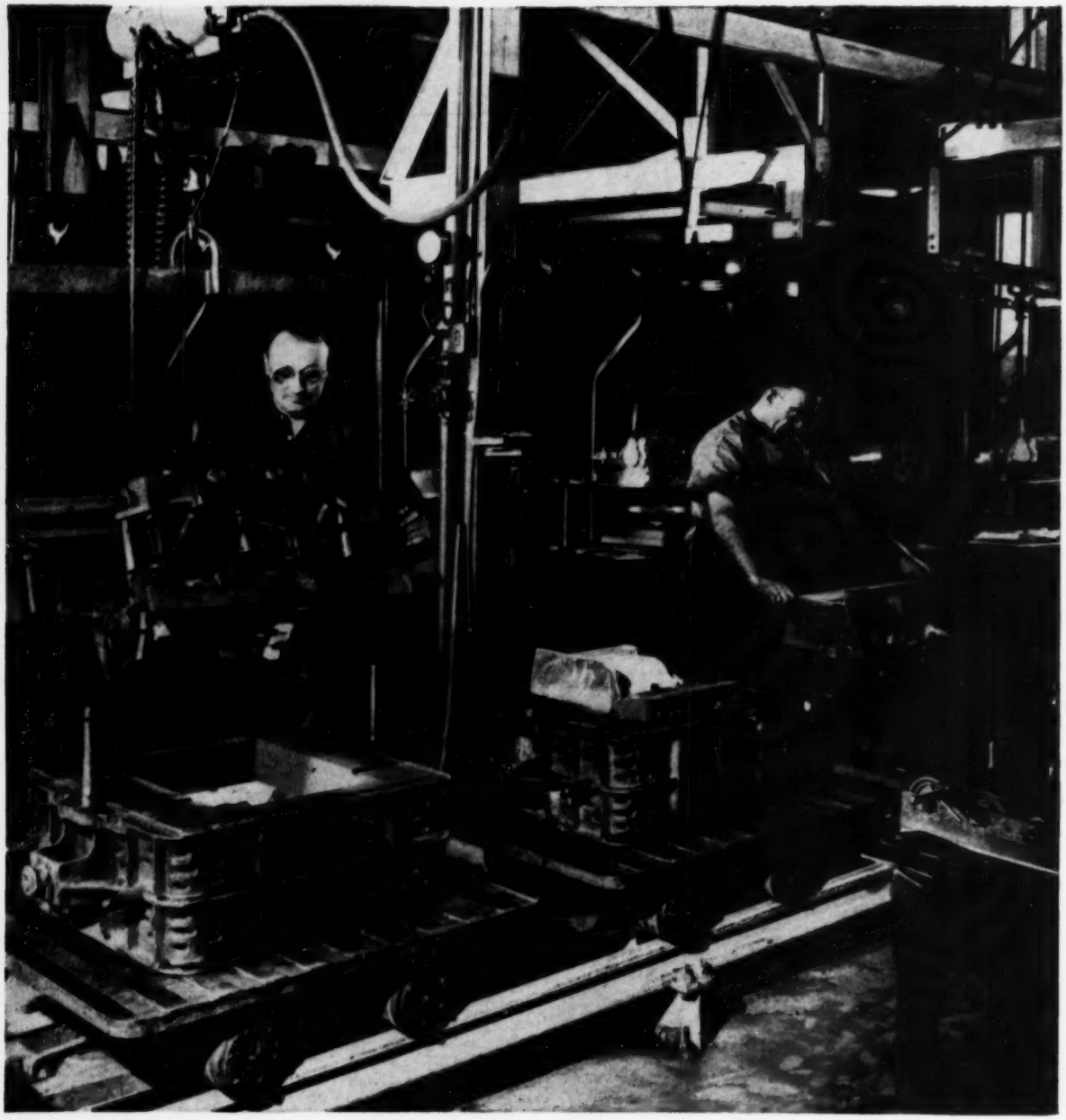
115 NORTH OHIO ST., MINSTER, OHIO



COMPLETE FOUNDRY ENGINEERING SERVICE

Basic Layouts — Equipment Installation Designs — Production Analyses — Equipment Design and Specifications — Purchase Recommendations — Fume, Smoke and Dust Control — Architecture — Process Piping — Power Distribution — Heating and Ventilating — Specifications and Contracts

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INDUSTRIAL ENGINEERING DIVISION
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THERE'S A TOUCH OF TENNESSEE IN FOUNDRIES

In gray iron and steel foundries producing the world's varied requirements of castings, look for products from TENNESSEE. Ferro alloys in briquettes and granulated form to improve metal properties and insure quality castings . . . Tenn-Sil foundry sand additive to reduce molding defects, to lower gas volume and to free sand of carbon... low-phosphorous pig iron to make special steels and iron . . . all supplied by TENNESSEE for faster and more efficient foundry operation and higher quality foundry products.

The many other basic materials from TENNESSEE are used by key industries everywhere. That's why TENNESSEE is known as an industry serving all industry.

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BUCKEYE CONTINUES TO DEVELOP AND IMPROVE PARTINGS AND FOUNDRY SUPPLIES

Photo taken in Peerless Foundry Co. Elmwood Place, Ohio

NOTE! If you do not have a sandslinger operation and want to make a big savings, try—

New, Improved PARLEX

another recent technological advancement in

BASE LIQUID PARTING

Where dry parting is indicated, we recommend our

AVON (white) ***Non Silica Parting***

vastly superior to all previous partings of this type.

ONE of our recent laboratory developments — and intended primarily for use as a parting agent in sandslinger operations — *Slinger-slick* will part equally well when sprayed, swabbed or brushed on all types of molding processes: roll overs, squeezers, etc. A base liquid parting, *Slinger-slick* is *unusually economical.* Just add kerosene or other solvent. Saves on material . . . Saves on freight...Non-inflammable...Not affected by cold... Will not settle out...Guarantees clean parting, smooth molds. Usually packed in 55 gal. drums. Write on your letterhead for—

1 Gal. Sample FREE. Prove it at our expense. Write today!

Manufacturers also of: Linseal and Buckeye Core Oils . . . Buckeye *High Temperature* Furnace Cement . . . Stick Fast Core Paste . . . Linco Core Compound . . . Buckeye Patented Flask Guides and Specialty Foundry Products.

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Phone Spring 4-7180
Donald Sales & Mfg. Company

Dayton, Ohio
Phone Kenmore 6104
Fenton Foundry Supply Co.

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Foundry Service Company

Lancaster, Pa.
Phone 3-2474
Lancaster Foundry Supply Co.

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(SHOT AND GRIT)

OUT FRONT IN THE FIELD

MALLEABRASIVE was developed by Globe Steel Abrasive Company at Pangborn's demand for a premium abrasive. Our experience with it in thousands of applications surpassed every expectation. It is a GREAT Blast Cleaning Abrasive from every viewpoint—efficiency, maintenance, and cost. It will pay you to switch to Malleabrasive and cut *your* cleaning costs. Send your order to: PANGBORN CORPORATION, 1300 Pangborn Boulevard, Hagerstown, Maryland.

*Reg. U. S. Pat. Off.

Pangborn BLAST CLEANS CHEAPER

with the right equipment for every job

Chapter News

continued from page 124

Northeastern Ohio

JACK C. MISKE

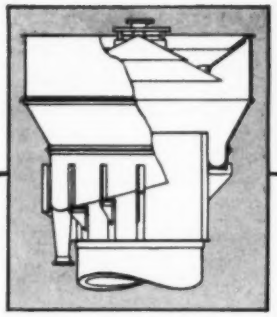
A large turnout of members marked National Officers Night at the March 12 meeting of Northeastern Ohio Chapter of the A.F.S., at the Tudor Arms Hotel, Cleveland. National A.F.S. officers present for the occasion included President I. R. Wagner, Electric Steel Castings Co., Indianapolis; Secretary-Treasurer William W. Maloney; and Director H. G. Robertson, American Steel Foundries, Alliance, O.

Addressing the gathering, President Wagner complimented the chapter on its operation and activities. He noted that it is now the second largest AFS chapter and is pushing Chicago for the No. 1 position having gained 105 members since September, 1952. He also announced the purchase of the site for the new A.F.S. building in Des Plaines, Ill., a suburb of Chicago. Mr. Maloney then discussed the new building and expressed the belief it would be started soon and completed without further delay.

The chapter's entrants in the AFS apprenticeship contest were present as guests. Wood and metal pattern winners as well as ferrous and nonferrous casting winners were introduced and awarded their prizes.

continued on page 132

This group gathered at the March meeting of the Northeast Ohio Chapter, when the apprentice contest was judged. Included are I. R. Wagner, President, A.F.S. (right foreground), Frank Cech, Chapter President; Jim Goldie, Cleveland Trade School, S. E. Parker, Fulton Foundry & Machine; Sam Sineone, Hill Acme Co.; Leonard Perkowski, Cleveland Standard Pattern Works; John Bolibursh, Motor Patterns Co. (with Mr. Wagner); Lewis Backus, Cleveland Standard Pattern Works; Stanley Stobierski, Cover Pattern Works; John Svancara, Cleveland Trade School; Robert Watkins and Robert Kern, both of the Trade School, and Rodamer Ramor, Hill Acme Co.



SCHNEIBLE

CUPOLA COLLECTORS

WASH OUT FOUNDRY FLY-ASH AND FUMES TO CUT BUILDING MAINTENANCE COSTS

Here's a modern automotive foundry with 8 Schneible Cupola Collectors on guard against corrosion and deterioration. Fly-ash and fumes cannot play havoc with roofs, gutters, stacks or machinery. Building maintenance is kept at a minimum.

These Schneible Collectors effectively wash out the elements that cause nuisance and sluice them away to dewatering and recirculating tanks for easy removal.

Economy of operation and efficiency are outstanding features of these Cupola Collectors. Water conservation is assured because the dewatering tanks are designed to purge and recirculate the same water continuously. There are no moving parts that require maintenance and the water distribution head cannot clog.

Your local Schneible representative has further information or write direct for bulletin No. 449.

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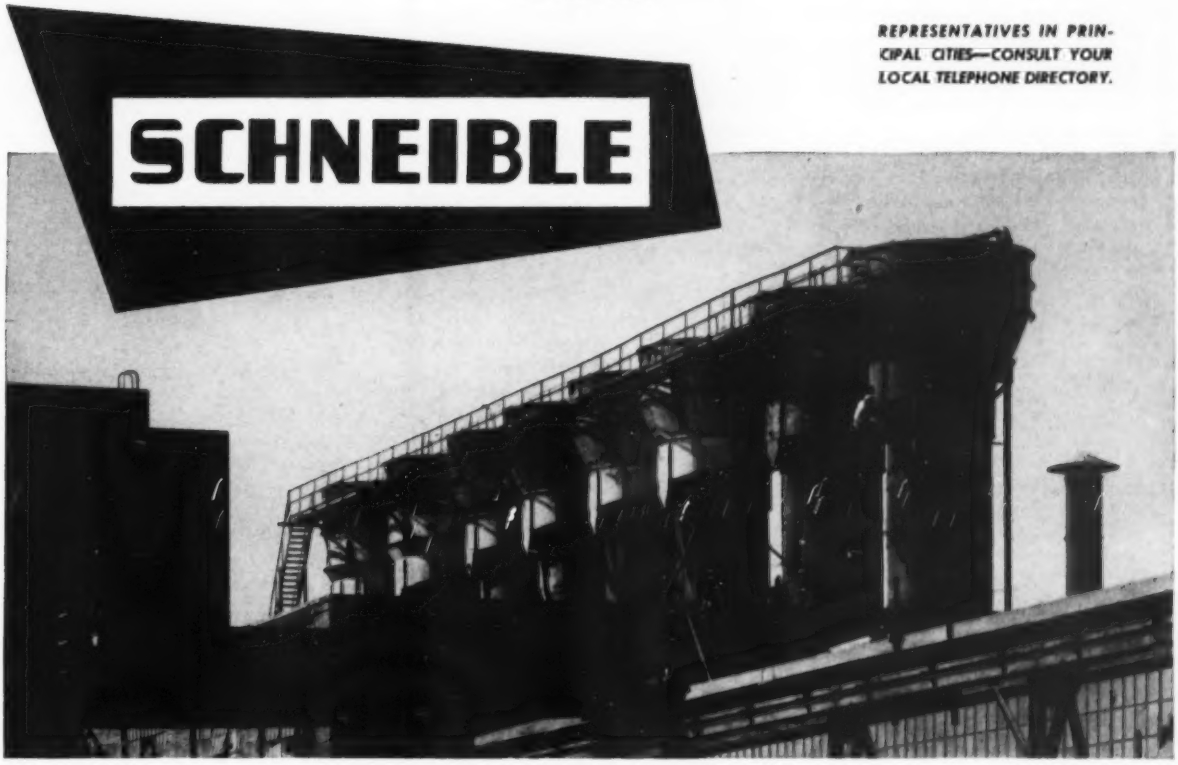

Chapter News

continued from page 130

Three representatives of foundry equipment manufacturing firms presented the technical portion of the program. A. Lesley Gardner, advertising manager, Pangborn Corp., Hagerstown, Md.; John S. Parker, sales manager, SPO Inc., Cleveland; and E. B. Rich, general sales manager, American Wheelabrator & Equipment Corp., Mishawaka, Ind., explained the latest developments in equipment and how that equipment can benefit the foundry industry. Mr. Gardner and Mr. Rich explained the development of centrifugal blast machines, and Mr. Parker explained the meaning of "pushbutton molding" and how the equipment that makes this possible operates.

Obituaries

IRVING R. SMITH

RALPH W. HISEY

Irving R. Smith, Sterling Wheelbarrow Co., Milwaukee, executive for 43 years died February 26. In 1920 Mr. Smith opened and started the two English branches of the company, known as Sterling Foundry Specialties Ltd., at Bedford and Jarrow, England. He was named president of these two branches and the parent company the following year. Richard A. Smith succeeds his father as president.

U. L. Jobe, Studebaker Corp., foreman, died recently of a heart attack. Mr. Jobe was born in California, Mo., and lived in the South Bend area for the past 30 years. He was a member of Studebaker Management Club and American Legion Post No. 50.

John G. Mingle, air pollution chief, Indianapolis, died March 29. Born at Ceresco, Mich., Mr. Mingle moved to Indianapolis in 1922, and had many years' experience as consultant combustion engineer in the Indianapolis area. He was a 1913 graduate of Purdue University, and formerly was district engineer for the bureau of Mines, Washington, D. C.

Raymond O'Brien, president, Detroit Brass & Malleable, died March 24 of a cerebral hemorrhage.

Ralph W. Hisey, who retired from Osborn Manufacturing Co., Cleveland, in 1945, after 32 years as vice president-manufacturing, machine div., died unexpectedly February 16. Mr. Hisey was born in Warsaw, Ind., and moved to the Cleveland area in 1920. He was a past president of the Foundry Equipment Manufacturers' Association.

Henry De Belius, formerly associated with Kendallville Foundry, Inc., Kendallville, Ind., died March 30 at South Bend, Ind. Mr. De Belius was an active member of Michiana Chapter for many years.

Harold C. Osman, 61, vice president-sales manager, Crucible Steel Casting Co., Lansdowne, Pa., died March 17. Mr. Osman began his career in the steel casting industry after graduation from the University of Illinois in 1911.

G. H. Kann, president of Pittsburgh Crushed Steel Co., died April 9. Mr. Kann was a past director of Foundry Equipment Manufacturers' Association.

Emmett A. Williams, 62, vice president of National Bearing Div., American Brake Shoe Co., N. Y., died April 14 following a surgical operation.

Rochester Chapter

HERBERT G. STELLWAGEN
Hetzler Foundries, Inc.

Mr. Donald J. Reese, International Nickel Company, enlightened Rochester foundrymen at their April 7th dinner meeting, held in the Seneca Hotel, talking on what is happening in the foundry industry in the United States.

Giving a seven-year analysis of the progress of the foundry industry, Mr. Reese stated that there are jobbing foundries in every state of the Union except Wyoming. How complex an industry can be, is demonstrated by the many foundries making similar products, but only in their own way.

Shell molding is changing methods of manufacturing castings, Reese said. This being a practical means of making castings for a portion of the industry, the objective of shell molding is to decrease man-hours per ton of product and reduce dust.

New methods are being developed so castings can be made by the shell molding process off any kind of pattern, wood or other material, Mr. Reese continued.

Cores are now being made of bonding materials that set at air or room temperatures. The past ten years show no other period comparable, as to progress made in the foundry industry.

In the depression years of the Thirties, a 42-in. Cupola and Spark Arrestor, could be purchased for $600.00. In 1952, it is known that as much as $150,000 was spent for a new modern cupola.

Finally, Mr. Reese pointed out that notable progress is at hand with cast iron being made with tensile tests as high as 60,000. We are entering a whole new Shell-Molding–Electric Melting era.

Washington Chapter

HAROLD R. WOLFER
Puget Sound Naval Shipyard

The March meeting of the Washington Chapter was held in Everett, Washington at the Monte Cristo Hotel.

Mr. William S. Pellini, head, Metal Processing Branch, Naval Research Laboratory, Washington, D. C., was the speaker of the evening. His subject was "The Feeding Range of Risers."

Mr. Pellini showed some very excellent colored slides. He demonstrated how metals freeze thru a mushy state before complete solidification takes place. He pointed out that as castings freeze, dendrites or branched tree-like crystals of solid metal grow progressively from the casting skin toward the

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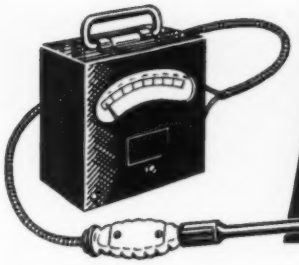


How The Nation's Foundries "CHECK UP"

THERE is no guesswork in the modern brass or aluminum foundry. Temperature of molten metals is measured both in the furnace and in the ladle. The experienced foundryman makes sure that his metals are poured at just the right heat, thus eliminating the chance of flaws in castings due to overheating and underheating.

Most of these nonferrous foundries use Marshall Enclosed-Tip Thermocouples. With these simple instruments, temperatures of molten metals can be checked quickly and accurately. Tip of Marshall thermocouple is immersed directly into the molten metal, assuring a quick temperature reading.

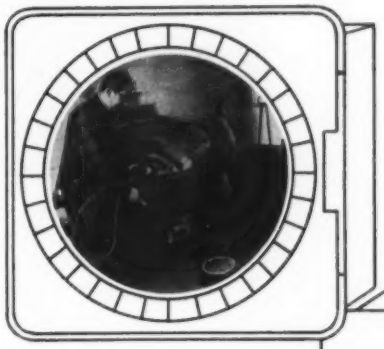
Being completely enclosed, this tip is not affected by slag, and the tip will endure a large number of such immersions. While made to be highly sensitive to temperature, the Marshall Thermocouple is built for rugged day-in and day-out foundry use.

Thermocouples aid in eliminating mis-runs, cold shuts, pin holes, excessive shrinkage, spongy castings, and many other "casting troubles" that plague the foundryman.

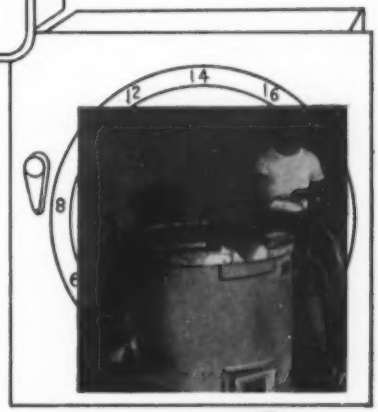
When checked frequently for temperature, metal can be poured at the exactly right heat for producing strong, sound, dense castings. Write to **L. H. MARSHALL CO., 270 W. LANE AVE., COLUMBUS 2, OHIO,** for prices and complete descriptive data.

The hot-junction tips of Marshall Thermocouples are easily renewable. A new replacement unit, which includes necessary thermocouple wires, can be installed in a moment.

FURNACE AND LADLE TYPES



The Thermocouples are used with both the portable type and the stationary type of indicators.



Marshall Thermocouples are available in both Furnace and Ladle types. The 50-inch Furnace type, with the 90°-angle bend at the tip, measures temperatures in both furnace and ladle. The straight, 35-inch long Ladle type is ideal for use at the ladle, and with portable indicator.

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center. The liquid surrounding these columnar crystals is in a mushy state and does not travel with any great ease along the channels existing between the maze of solid crystals growing inward from opposite walls of the casting. In that part of a casting in which this inward growth of dendrites proceeds at a simultaneous rate, where they meet in the center or last solidifying area at the same time, movement of feed metal from the riser or from heavier adjacent areas not yet solidified is impossible or greatly hindered. Therefore, this zone or area, in which no temperature gradient existed between the point farthest from the riser and the point nearest to the riser or source of feed metal, will solidify finally from the mushy metal trapped by the dendritic fronts converging in the center plane of the section. Since this mushy area has been isolated in the latter period of solidification, when it freezes it will not completely fill the space it occupied in its mushy state and centerline shrinkage, voids will be present.

The problem, Mr. Pellini said, is to eliminate these zones of simultaneous freezing. Experimental results indicate that a riser will feed (on flat plate castings) a distance, from its center, equal to 2T (where T equals casting thickness). He also indicated that the edge or end wall of the casting influences the temperature gradient on cooling. This he termed "edge effect." He explained that extraction of heat from the casting by the end mold wall in addition to the top, bottom and sidewalls, produces more rapid freezing. This effect has been measured and extends from the edge of the casting for a distance of 2½T or thickness of casting.

Thus, if a riser is placed so that its feeding distance (2T) reaches to the zone where the edge effect operates, there will be progressive solidification from the end of the plate to the riser connection and a casting without centerline shrinkage will be produced. If the total distance is greater than these combined distances (total 4.5T) centerline shrinkage will appear when the casting is radiographed.

Mr. Pellini explained that chills extract heat 12 times as fast as sand surfaces. He said that chills (equal in thickness to T) will increase the end effect on freezing by 2T. An added advantage is gained by placing a chill (surface) between adjacent risers to create an artificial casting end for both risers, increasing the feeding range.

Philadelphia Chapter

D. E. Best
Bethlehem Steel Co.

More than 150 members and guests heard Mr. Thomas J. Wood, Chief Metallurgist of the Brake-Shoe & Casting Division of American Brake Shoe Co., Mahwah, N. J., discuss "Acid vs Basic Lining for the Cupola", at the March meeting of the Philadelphia Chapter, A.F.S. John P. Laux, Jr., foundry supt., Pusey & Jones Corp., served as Technical Chairman.

Mr. Wood stated that in the transition of the foundry industry from an art to a science, it was inevitable that the cupola would receive attention. Probably the major technical development in cupola operation in recent years has been the investigation and use of basic refractories and slags as a result of the nodular iron process, and its requirements for low-sulfur iron, and the production of special purpose flake graphite irons.

Discussion also included, physical properties of irons produced and comparative costs, as applied to the various production processes.

Mr. Wood felt that, despite unfavorable cost of basic operation, the possibility of producing low phosphorus and sulfur irons without resorting to higher percentages of pig iron is attractive to most foundry operators and is of keen interest to those foundries producing flake and nodular graphite irons. To offset higher refractory and silicon costs there are two possibilities: (1) Water cooling at the melting zone of the cupola, (2) Development of the graphite block lining for the melting zone area.

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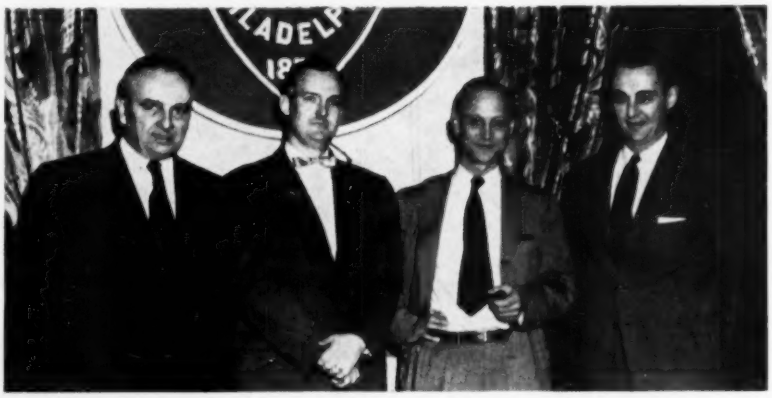


Thomas J. Wood, third from left, American Brake Shoe Co., was guest speaker at the March meeting of the Philadelphia Chapter. Others are (l. to r.), Charles O. Butler, Palmyra Foundry Co; Chapter Director Charles W. Mooney, Olney Foundry Div., Link-Belt Co.; and John P. Laux, Jr., Pusey & Jones Corp, Technical Chairman.
Photo by Leo Houser, Dodge Steel Co.

Members of the Ontario Chapter recently heard Mr. S. C. Massari, National Technical Director of A.F.S., shown here addressing the group. Others at speakers' table (from extreme left), J. Perkins, Ford Canada, Ltd.; A. Reyburn, Ontario Chapter Chairman, Cockshutt Farm Eqpt., Ltd.; A. Pirrie, Vice-Chairman of the Chapter, Standard Sanitary Dom. Radiator, Ltd.; J. Hughes, J. T. Hepburn, Ltd.; and J. King, Archer-Daniels-Midland, Ltd. A large group attended meeting.

Rammed Up and Poured

Bill Walkins, the foundry bard.

A Way Of Life

It's vacation time, and we're driving and touring.
The wide open spaces, we find, are alluring.
The car rolls along to a fresh country breeze
Past meadows and orchards and clumps of green trees.

"Don't you ever wish," says my wife, bright eyed,
"You could live in the country and work outside?
Why not save our money and buy us a farm?
A pig and a cow and a house and a barn.

"I'd spend my time in the garden, a-picken'
The beans and the berries, or feeding the chickens.
And you with a tractor and moving machine
In a fragrant field where the hay is green."

"Look, Honey," I say, "I was raised in the city.
The country is nice, it's fresh and it's pretty;
But I'd be unhappy, I wouldn't know how
To milk a horse or to hitch up a cow.

"I'd long for the dust and the furnace's smoke
For rods and for rammers and metal and coke.
To smell oil cores, as they bake, and to feel
The crunch of the sand 'neath my safety shoe's heel.

"To watch the hot metal that's poured in the mold.
To see a good casting before it is cold.
This Foundry business," I say to my wife,
"Is more than a job; it's a way of life."

From the book Rammed Up and Poured, by Bill Walkins, copyrighted by the Electric Steel Foundry Co.

To Americans Also

The proclamation below, which came to A.F.S. from the Institute of Australian Foundrymen, applies equally to America as it does to the great and growing continent "Down Under." It is a message that might well be placed in the hands of every plant employee, regardless of race or religion, as the kind of creed to which any good citizen can subscribe, and AMERICAN FOUNDRYMAN publishes it for that purpose.

A Call To The People Of Australia

THERE are times in the histories of peoples when those charged with high responsibilities should plainly speak their minds.

Australia is in danger. We are in danger from abroad. We are in danger at home. We are in danger from moral and intellectual apathy, from the mortal enemies of mankind which sap the will and darken the understanding and breed evil dissensions. Unless these are withstood, we shall lack moral strength and moral unity sufficient to save our country and our liberties.

Our present dangers are a challenge to us: but in meeting the challenges of history, peoples grow in greatness.

The dangers demand of all good Australians community of thought and purpose. They demand a restoration of the moral order from which alone true social order can derive.

We remind all Australians that we are members one of another, dependent even for our daily bread on the work of many. From the community we have our livelihood, culture, protection in a reign of law. To the community we owe a just return of loyalty and service.

WE BELIEVE

that each of us has a duty to defend the community against evil designs and aggression and to preserve for our children that which was given to us,

that each of us has a duty to deal fairly with his fellows in the transactions of life,

that each has a duty to himself and to his fellows of honest work,

that the development of a true community amongst ourselves and with all peoples of good will is the one way to peace at home and abroad.

THEREFORE

we call for a new effort from all Australians to advance moral standards. We ask for it from individuals in their personal and vocational relationships; in and through the lives of families; in and through all our voluntary associates: trades unions, employers' and professional groups, the organisations of women, of servicemen, and all the societies which our people have created to express their cultural, social, and economic interests.

We call for an adequate understanding of the nature of law and of its necessity as the principle of order in a free society.

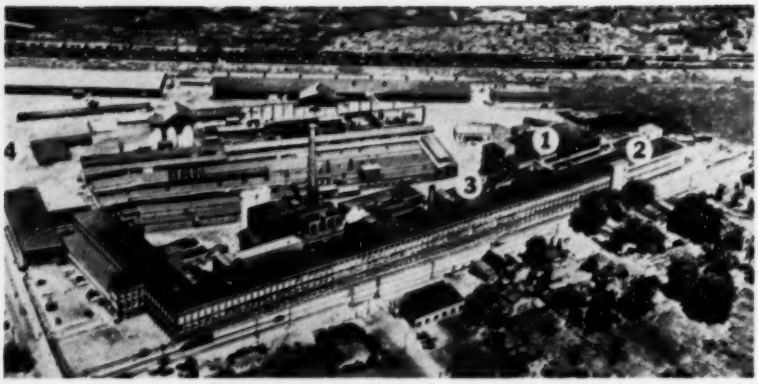
We call on all Australians to take the active concern in public affairs proper to citizens of a free society.

We call on each Australian to examine his conscience and his motives in all his associations with his fellows. If each does his part, the whole community will be renewed.

We call on our people to think now of the future into which our children will go, that we may shape it well and wisely for them.

We call on our people to remember those whose labours opened this land to the uses of mankind; those who bore and reared the children of a new nation: those who died in battle for us, bringing splendour to Australian arms; those who worked with mind and muscle for the heritage which we, please God, shall hold and enlarge for our children and their children. And that this may be so, we ask that each shall renew in himself the full meanings of the call which has inspired our people in their highest tasks and in their days of danger:

FEAR GOD, HONOUR THE KING.
(I Peter 2:17)



Nearing Completion — a building expansion program, started in 1946, which will add 180,000 sq ft to manufacturing facilities of Crouse-Hinds Co., Syracuse, N. Y. In 1950, the first phase of its program, a building (1) to house new screw machine and general machining departments as well as new pattern and tool making shops, was completed. Second phase (2), a heavy machining department, and assembly facilities for explosion-proof electrical products and traffic signals were added last year. Another addition (3) was constructed to house a materials testing and electrical laboratory and a new finishing department. Final phase of the program, construction of a 45,000 sq ft foundry (4), is under way.

Foundry Tradenews

Wheelco Instruments Div., Barber-Colman Co., Rockford, Ill., has announced new addresses for the following branch offices and representatives: William Karslo, 338 East 25th St., Baltimore; E. W. Hefferman, 435 Newtonville Ave., Newtonville, Mass.; H. F. Dahlke, 2561 North Clark St., Chicago; G. H. Hatfield, 1951 Richmond Ave., Houston; Herbert Proske, 66 Hudson St., Hoboken, N. J.; J. W. Hancock, 1433 West Erie Ave., Philadelphia; Victor Lathers, 1300 Rock St., Rockford, Ill.; H. C. Reimers, 3714 - 14th Ave., Rock Island, Ill.; Ken Coates, 1011 Ridgely Bldg., Springfield, Ill.; George Knowler, 6693 Park Ave., Montreal, Que.

To show the scope and application of the company's products, **Ferranti Ltd.,** electrical and general engineers, Hollinwood, Lancashire, England, have published a 32-page catalogue. The brochure graphically illustrates procedures from designing and assembling of the wood master pattern through charging and melting to the finished castings. Castings of NOMAG—used in electrical and allied trades, and NOduMAG—a ductile non-magnetic iron are featured.

Net earnings of **International Nickel Company of Canada, Ltd.,** for 1952, although the second highest in the company's history, showed a decrease over the previous year. The company's annual report notes that after preferred dividends, these earnings were equivalent to $3.90 per share of common stock. They compare with $4.17 per common share for the previous year. According to the report, this was brought about by the reduction in the value of the U.S. dollar on which sales were principally made, relative to the Canadian dollar, in which costs are principally incurred, as well as by increased production costs.

Management Development Institute has been set up at 6511 S.E. 28th St., Mercer Island, Wash., by Charley H. Broaded to teach management techniques by correspondence. Director of industrial relations at Fisher Flouring Mills Co., Seattle, Mr. Broaded has taught management courses for the University of Washington and on a private consulting basis.

New York City domestic sales offices of **Abrasive Div., Grinding Machine Div., and Refractories Div., Morton Co.,** Worcester, Mass., formerly of 61 Broadway, have moved to Green and North St., Teterboro, N. J. Their new headquarters at the Behr-Manning warehouse and office at Teterboro (a Norton affiliate), have been established to improve service to customers.

According to their 51st annual report, net earnings of **American Brake Shoe Co.,** New York, for 1952 amounted to $3.52 per common share, as compared with $5.19 for the previous year. The decline in net earnings is attributed by the company principally to a reduction by customers of their inventories, the nation-wide steel strike and strikes at several company plants.

Apex Smelting Co. celebrates its thirtieth anniversary with the opening of a million dollar smelting plant in the Los Angeles industrial area near Long Beach, Calif. The plant will provide the West Coast with a new source of alloys and will consume scrap aluminum and magnesium, which is generated in large quantities by Southern California factories, and which formerly had to be shipped to the Midwest for consumption.

Dedication Ceremonies — American Smelting & Refining Co., recently held open house at their new research laboratories at South Plainfield, N. J. The new location is convenient to both the company's main offices and the Perth Amboy plant. To acquaint guests with some of the functions of the laboratory, special exhibits and demonstrations were arranged. The laboratory's major endeavor is concerned with the investigation of metallurgical processes and the behavior and properties of the company's products in the form of both pure metals and alloys.

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Ontario Chapter

F. J. Rutherford
Refractories Eng. and Supplies, Ltd.

March 27 is a date to be remembered in Ontario Chapter annals. Approximately 300 members and guests came from all over Ontario, nearly 85% of the total number of members in the chapter. From Windsor, 200 miles away—from Owen Sound, 160 miles away—from Port Arthur—over 400 miles; from large and small foundries they travelled to St. Catharines.

During the day hundreds visited the new multi-million dollar Gray Iron and Malleable Shops in McKinnon Industries Limited new foundry at nearby Merritton. Members, through the courtesy of T. J. Cooke and J. Barbeau were shown the best in foundry layout and equipment. It is a plant in which we, as foundrymen and Canadians can take particular pride.

D. J. Willmot and F. Fetes of Anthes-Imperial Ltd. also opened their doors to the visitors and the latest in pipe casting equipment was viewed with considerable interest.

In the banquet room the seating capacity of 225 was exceeded, and many had to eat their meal elsewhere, returning for the technical session. Seated at the head table were the members of local foundries, headed by D. J. Willmott, Anthes-Imperial. Mr. Willmott welcomed Ontario Chapter to St. Catharines in the first visit in history. He expressed the hope that it would be a yearly occasion.

In a short business meeting, officers of the Ontario Chapter for the 1953-54 season were elected. From June 1st, A. Pirrie, Standard Sanitary & Dominion Radiator, is to be Chairman; F. J. Rutherford, Refractories Engineering & Supplies Limited, Vice-Chairman. G. L. White, B. L. Smith Publishing Co. Ltd., continues as Secretary-Treasurer. The new slate of directors includes John Allan, Callendar Foundry Limited; Herb Fairfield, Wm. Kennedy & Sons Limited; Norman Bennett, Canadian General Electric Co. Ltd.; and Frank Kellam, Electro Metallurgical Company Limited.

Some 19 new members were introduced to the gathering, of whom 16 were from McKinnon Industries Limited. W. Bryce, the Membership Chairman, paid tribute to all members for their interest in sustaining our membership.

To top off the day, the crowds jammed the lecture hall to hear Cecil Maddick, Massey-Harris Co. Limited, Brantford, Ontario, speak on "Shell Molding." Mr. Maddick, speaking with the authority of a pioneer in this field, gave facts and figures in such an interesting manner that he held his audience far beyond the close of the meeting. He especially pointed up the need for additional research in this method and showed how many of the pitfalls might have been avoided in shell molding by the preparation of certain basic rules and techniques as a guide.

University of Illinois

Oliver Smith

Members of the Student Chapter at the University of Illinois were privileged to have their annual banquet in conjunction with the dinner for the men attending the S&H&AP conference there.

A mechanical engineering handbook was presented to student Wilford H. Couts in consideration for his abstract on insulated feeders, which was judged the winner of the annual contest sponsored by the Student Chapter. This contest is open to students enrolled in the fundamental foundry course and permits the student to base his essay on any phase of cast metal work.

A speech by I. R. Wagner, national president, A.F.S., was followed by a short business meeting of the students. A code of by-laws was presented for approval by Bruce Cook, Chapter Chairman. The by-laws, which pertained principally to duties of officers and the establishment of committees, were accepted by a vote of the members.

Central Illinois

L. E. Kinsinger
Caterpillar Tractor Co.

The Central Illinois Chapter held its April meeting at the American Legion Hall, Peoria, Illinois. Robert Dickinson, Brass Foundry Co., Peoria, presented the nominating committee's slate of officers. The election of Chap-

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Safety slides are the subject of discussion for (l. to r.) G. W. Harper, Associate Prof. of Mechanical Engineering and Safety Education, Univ. of Ill.; Dan Farrell, Supervisor of Safety, U. S. Steel Corp.; and H. S. Simpson, Technical Chairman, Safety Engineer, Caterpillar Tractor Co. This April meeting of Central Illinois Chapter was held in Peoria.

Wilford H. Couts, winner of the Univ. of Illinois Student Chapter essay contest, receives a mechanical engineering handbook for his abstract on insulated feeders. Shown presenting award (l. to r.) Prof. N. A Parker, Head, Mechanical Engr. Dept.; W. L. Everitt, Dean, College of Engineering; and Mr. I. R. Wagner, National A.F.S. President.

MANGANESE . . .
Deoxidizer and Toughener for Steel

Manganese is one of the most important alloys used in making steel. It is practically indispensable as a deoxidizer and cleanser for improving the hot-working properties of steels. When used as an alloying element, it makes steel stronger and tougher and it is therefore an important constituent of many structural and engineering steels.

Deoxidizes and Cleans Steel

The effectiveness of manganese in deoxidizing steel was first recognized in 1856, when it was used in the Bessemer process of steelmaking to counteract the bad effects of sulphur; in fact, manganese made this process a commercial success. Today, manganese is used as a deoxidizer and cleanser in the production of nearly all grades of open-hearth and electric-furnace steel, as well as high-grade cast iron.

Research work carrried out recently in ELECTROMET's laboratories at Niagara Falls, New York, has provided new and important information on the value of manganese as a deoxidizer. This work shows that manganese is a more effective deoxidizer than has been previously realized; and that a combination alloy of silicon and manganese is a much stronger deoxidizer than either silicon or manganese by itself. Complete information is given in a report entitled "Solubility of Oxygen in Liquid Iron Containing Silicon and Manganese." If you would like a copy of this report, free of charge, write to the address above.

Improves Hot-Working Properties

By combining readily with sulphur, manganese performs another valuable job, it removes the principal cause of hot-shortness or brittleness—thereby giving steel better rolling and forging properties. In this reaction, the manganese combines with the sulphur to form manganese sulphide, as follows:

$$Mn + FeS = MnS + Fe$$

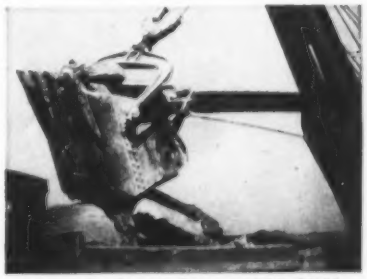
The manganese sulphide remaining in the steel is a less harmful type of inclusion than the iron sulphide would be, and the hot-working properties of the steel are improved.

The weakening and embrittling tendencies of sulphur in cast iron can also be counteracted by the addition of manganese to the cupola charge.

Increases Strength, Toughness, and Wear-Resistance

When used as an alloying element in steel, manganese produces a steel with greater strength and toughness, and there is no serious loss of ductility. Additions of about 13 per cent manganese produce the well-known Hadfield manganese steel. High-manganese steels have exceptional resistance to wear; and consequently they have many applications in engineering jobs. Instead of wearing away quickly under conditions combining severe pressure, shock, and abrasion, these steels actually become harder through use. Thus, they last longer.

Because of the tendency of high-manganese steels to work-harden, they serve industry in important and varied applications. Manganese steel castings, for example, are used for railroad frogs and crossings, rock-crusher parts, steam-shovel dipper teeth, and dredge-bucket lips. The chief applications of manganese steel are in rails used for special service, and light forgings subjected to heavy wear.



Dipper bucket teeth, cast of Hadfield manganese steel, actually increase in hardness under abrasive wear from gravel and rock in construction work — thus last many times longer than those of ordinary steel.

ELECTROMET Alloys

Manganese is produced by ELECTROMET in forms suitable for practically every use of the iron, steel, and non-ferrous metal industry. Some of the ELECTROMET products are listed below. For a complete description of these alloys, write for a copy of the booklet, "ELECTROMET Products and Service."

Alloys of Manganese and Their Uses

Standard Ferromanganese	The product most commonly used for adding manganese to steel for the purpose of alloying or deoxidizing and cleansing.
Low-Carbon Ferromanganese	For adding manganese to steels having a low carbon content, such as stainless steels of the 18 per cent chromium, 8 per cent nickel type.
Medium-Carbon Ferromanganese	Commonly used for making manganese steel containing 1.50 to 2.00 per cent manganese, and in the production of Hadfield manganese steel.
Low-Iron Ferromanganese	For applications in the nickel, aluminum, and copper industries where a low-iron alloy is required.
Silicomanganese	Used by the steel industry as a furnace block; as a deoxidizer; and also for manganese additions, particularly in the production of engineering steels containing 0.10 to 0.50 per cent carbon.
"EM" Silicomanganese Briquets	For adding manganese (with silicon) to cast iron in the cupola.
"EM" Ferromanganese Briquets	For adding manganese (without silicon) to cast iron in the cupola.

Chapter News

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ter Officers will be held at the May meeting.

Technical Chairman, H. S. Simpson, Safety Engineer, Caterpillar Tractor Co., Peoria, introduced the feature speaker, Dan Farrell, Supervisor of Safety, U. S. Steel Corporation, Pittsburgh, Pa. The topic was "Scientific Management Principles Applied to Safety."

Mr. Farrell said our objective is to prevent industrial accidents that cause injury to our employees. To do this, accidents must be analyzed as we do accounting and engineering reports.

A survey must be made of previous accidents and this can be done with groups of 250 employees or less. As these accidents are noted among men of certain classifications and areas, critical situations will become apparent, and those with the most frequency and seriousness must be given the most attention. Those accidents in this group, the points of contact where the employee was struck by, struck against, or struck between something, must be eliminated. These points are eliminated by installing guards or shields, charging methods, training, or using safety equipment such as glasses, hoods or gloves. Mr. Farrell had many slides to show how this analysis is made and said that by using this method the company he represents had improved a good safety record in 1948, further reducing it by 59%.

Central New York

HAROLD BRAKEMAN
City Pattern Shop

The April meeting of Central New York Chapter was held at Ithaca's attractive Statler Inn, Cornell University. About 100 members and guests attended.

Dr. Rhodes, Director, School of Chemical and Metallurgical Engineering, Cornell, welcomed the group, and commented on the inadequate number of graduates entering metallurgical engineering. An information program aimed at high school sophomores, Dr. Rhodes said, might be the answer in building increasing interest in metallurgical engineering as a vocation.

Speaker at the meeting was Mr. Clyde Sanders, Vice-President, American Colloid Co., and Chairman, A.F.S. Sand Division. Mr. Sanders showed how molding sand can contribute to

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apparent metal shrinkage. Addition of southern bentonite, sea coal and wood flour produced castings closest to pattern size. He used slides to illustrate his speech.

Metropolitan Chapter

ANDREW DEVLIN, *Daniel Goff Co.*
ROBERT J. ELY, *American Brake Shoe Co.*

Members of the Metropolitan Chapter enjoyed a program on the "Reclamation of Ferrous and Non-Ferrous Castings" at their regular monthly meeting held at the Essex House on March 2, 1953. The guest speakers were Mr. Wilson N. Pratt Director of Development, American Metalseal Corp., West New York, N. J., who spoke on casting impregnation; Mr. Art Kugler, Mechanical Engineer, Technical Sales, Air Reduction Company, New York City, who discussed welding; and Mr. Howard Vanderpool, Sales Engineering Manager, Metallizing Engineering Company, Long Island City, N. Y., who covered metallizing methods.

Mr. Pratt traced the history of reclamation of castings by impregnation from the early use of sodium silicate to the present-day practice of using modern resins. Such drawbacks as need for refrigeration and lack of a copper-stabilized material have been overcome. Steps in impregnation include cleaning the casting, evacuating the pores, putting in the polyester (styrene), applying pressure, curing and final cleaning.

In his discussion of welding methods, Mr. Kugler outlined 8 basic methods including arc, resistance, thermit, braze, forge, induction, and flow welding. He further showed that many combination and variation of these methods plus the use of different types of atmosphere or shielding make it possible to find a satisfactory welding technique for most any problem but that in many cases the limitations of available facilities or production requirements made compromises necessary. Mr. Kugler pointed out particularly the need for pre-heat and post-heat in cast iron welding.

Mr. Vanderpool emphasized in his discussion that, (1) proper surface preparation and, (2) selection of proper spray wire, were the major factors involved in obtaining desired results in castings salvage by metal spraying.

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He clearly indicated that the bond obtained was mechanical in nature and was not intended to improve the physical strengths of castings in the manner that weld repairs can be used. By proper selection of wire, good color match can be obtained without detrimental effects during later operations such as plating or dechromating.

Technical Chairman for the meeting was Dr. Norman E. Woldman, consulting metallurgical engineer and editor of *Alloy Digest*.

Twin-City Chapter

R. J. MULLIGAN

O. J. Myers, technical director, Archer-Daniels-Midland Co., Foundry Prod. Div., became Chairman of the Twin-City Chapter, April 14, following the election of officers for the coming year. He succeeds J. W. Costello, American Hoist & Derrick Co. Art Johnson, Northern Malleable Iron Co., St. Paul, was elected Vice-Chairman.

Directors elected for three-year terms were: Harry Blumenthal, R. Lavin & Sons, Inc.; John Roth, Progress Pattern Co., Minneapolis; and Mike Flotten. Lillian K. Polzin, Minneapolis Chamber of Commerce, repeats as Secretary-Treasurer for the coming year.

Speaker of the evening, Jack Caine, well-known consultant to the steel foundries, refuted many of the common beliefs about the importance of sand in quality castings, through his talk, "What Do We Know About Sand?"

Mr. Caine brought out the widespread misuse of sand control testing. The use of these data as criteria for evaluating sands is, according to Mr. Caine, a serious mistake. He pointed out that sand control tests should be applied to hold the variables within limits only after the foundryman knows: 1) what happens when his mixture is in contact with the molten metal he will pour, and, 2) why his sand mixture acts in this way.

Sand is rarely the cause of defective castings, the speaker maintained. Of much greater importance are such variables as: 1) sand-metal ratio, 2) type of metal, 3) mold or core surface, 4) configuration, 5) super heat, 6) time, 7) metal flow, 8) pressure, and 9) size of voids in mold or core. Too often the sand is blamed for failures without considering these more important factors.

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National Nominating Committee to be Chosen

Chapters not represented on the Nominating Committee during the past two years are eligible to suggest candidates for the 1952-53 committee. Eligible chapters should forward names of two members, for possible appointment to the Nominating Committee, to the National President not later than July 1 as prescribed by Art. X Sec. 1 of the By-Laws: *"The Board of Directors of each Chapter eligible to have a member on the Nominating Committee shall annually select two candidates for the Nominating Committee from the Chapter membership, preferably representing different branches or divisions of the industry with the membership. The names of the candidates shall be forwarded to the President on or before July 1 of each year."*

Chairman of eligible chapters who have not done so are urged to call board meetings soon to select Nominating Committee candidates. Names should be sent to I. R. Wagner, President, American Foundrymen's Society, 616 S. Michigan Ave., Chicago 5, Ill.

French Foundry Center Reports Progress, Growth

Modernization of French foundries and the Technical Center of the Foundry Industry are covered in the 10th issue of *France Actuelle*, new international medium of communication. Written in Paris and edited and printed in Washington, D. C., the new weekly is issued by a private, nonprofit citizen's committee of French intellectual and industrial leaders. One of the members is Pierre Ricard, president d'honneur, Syndicat General des Fondeurs de France.

"We need the founder in our daily lives," *France Actuelle* says, in pointing out the importance of the foundry industry in the economy of modern civilization. Most of France's 2,400 foundries are small or middle-sized, the publication reports, which are organized for individualistic rather than mass production. Accordingly, a system has been worked out whereby the various firms cooperate in research for better production methods—the Technical Center of the Foundry Industry and the Center's new laboratory.

Started in 1942, the Center was in full swing by 1945 and by 1952 was handling consultations at the rate of 36,000 a year. The program of the Center was strengthened last year when a network of laboratories was established. The principal laboratory, near Paris, covers 7,836 sq yd and is aided by nine regional laboratories.

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The effect of these many variables in a particular mix must be studied and evaluated by means of test castings wherein the variables are adjusted one by one. Finally, a sand mixture can be selected on the basis of these data and methodical control testing instituted to regulate its composition exactly.

Mr. Caine was most emphatic in denying the not-uncommon idea of a sand-metal reaction. Except in the case of some high manganese steel alloys, the only difference between various metals reaction to sand is their rate of heat transfer. Selecting this rate to be 100% for steel at 2900° F., the relative rates for other metals become 60% for iron at 2600° F., 40% for bronze at 2200° F., 14% for aluminum at 1600° F., and 6% for magnesium at 1200° F.

Mr. Caine built his talk around a series of charts, listing the principle variables which effected common casting defects (i.e. penetration, scabbing, and erosion). In no case was sand listed in a high position among the major variables to be investigated in controlling these defects.

Central Indiana

W. H. Faust
Electric Steel Casting Co.

Over 100 members of Central Indiana Chapter, representing 21 different firms, attended the monthly dinner meeting held at the Athenaeum on the 6th of April. Speaker for the business session, Mr. Ray Witschey, A. P. Green Firebrick Co., headed an information-packed discussion of refractories in foundries, supplemented by an appropriate group of slides.

Mr. Witschey grouped refractories in the general classification of acid, basic, and neutral, and then discussed in greater detail the properties attributed to these groups. He noted at this time that the type of refractory used is determined by the environment in which it acts.

Speaking more specifically on new and special uses of refractory materials, Mr. Witschey told of developments in the spraying of castables with a gun type applier and to watch for more of this in the future. Also that monolithic linings have been successful either for complete or partial electric furnace roofs. Ladles have had much attention recently, with plastic type linings improved with special coatings.

Two subjects particularly stressed by Mr. Witschey were the value of interchange of ideas from foundries and other types of industry, and the actual buying of the refractories by using the ASTM specifications. In the latter, it was pointed out that a great deal of actual savings in operational costs can be realized by ordering refractories by specification rather than using popular brand names. The brand name you remember may be the best for some applications, but not for the particular use you had in mind.

One portion of Mr. Witschey's slides showed a step by step construction of an annealing furnace with a flat roof made entirely of a castable refractory.

Among the guests at this well attended session were Mr. I. R. Wagner, Electric Steel Castings Company, President of the American Foundrymen's Society and Mr. W. J. Klayer, Central Indiana's Chapter Adviser.

Chicago

A new division was added to the round table groups of the Chicago chapter when the Maintenance Div. held its first meeting April 6. Speaking on *"Maintenance of Sand Handling Equipment"* was T. J. Glaza, Crane Co.; chairman was Frank Edwinson, International Harvester Co.

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A. F. S. and Facings Assn. Discuss Mutual Problems

Members of the Foundry Facings Manufacturers Association met in Chicago, February 11, for a discussion of air pollution and noise abatement problems, pending safety legislation, and advantages of palletizing facings materials. On invitation, six officials of A.F.S. met with the group to clarify Society activities and policies affecting the interests of facings producers and to develop better mutual understanding and cooperation.

The association's traffic committee, E. H. King, Hill & Griffith Co., Cincinnati, chairman, reported on a study of the use of disposable pallets for carload shipments of powdered materials in multi wallpaper bags. It was stated that extensive use of conveyors and automatic packing equipment have reduced the need for palletizing at producer plants, but the committee recommended palletizing at point of unloading.

A.F.S. was represented by President J. R. Wagner, Vice-President Collins L. Carter, past President W. L. Seelbach, Secretary Wm. W. Maloney, Technical Director S. C. Massari and S&H&AP Director W. N. Davis. It was the first meeting of its kind ever held by the two organizations and was presided over by L. H. Heyl, Federal Foundry Supply Co., Cleveland, president of the facings group.

Mr. Massari stated that A.F.S. is always anxious to have able and experienced men serve on the Society's technical committees, the only requirements being that they must attend meetings and be willing to contribute information for the industry. He explained that committee service is on a volunteer rather than an invitational basis and expressed the hope that members of the Facings Association would play a more active part in the work of various technical committees.

Guest speaker at the meeting was Warren A. Cook, director of industrial hygiene and engineering research, Zurich Insurance Co., Chicago, whose talk on "Noise and Air Pollution in Industry" offered a number of suggestions for developing better community relations. He urged management particularly to check public liability insurance contracts in the matter of coverage for single incidents and for occurrences over a period of time.

The speaker dwelt at length on noise abatement as a growing industrial problem, complicated by the fact that there is today no accepted level of noise above which it is generally agreed that hearing is damaged.

Mr. Davis described briefly the work of A.F.S. in developing engineering standards for the control of air pollution and noise in foundry plants. He also invited members of the group to participate in the foundry safety and health seminars sponsored by the Society at the Universities of Illinois and Wisconsin in February and March.

Members were informed that House Bill S-368, the "Murray Industrial Safety" bill, has been reintroduced in the Federal Congress, designed to give the federal government control over industrial safety practices through grants-in-aid to the states.

Information

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What makes a Magnet?

A new chart describing the natural forces causing magnetism and how they are harnessed to create a useful tool for industry and the home is now available. The chart first explains the potential magnetic forces found in ferromagnetic atom. How these natural forces are organized by the application of an external magnetic field is then concisely presented. *Eriez Manufacturing Company.*

For more data circle No. 7 on p. 18

Truck Attachments

How to increase the efficiency of your powered industrial trucks is the theme of a two color booklet now available. The use of various types of specially designed attachments enables one truck to do the job of many, thereby increasing economy of operation, plus greatly increasing its range of applications, according to the book. Each type of attachment is pictured and is accompanied with detailed text of its design and application. The literature is designed for quick and easy reference. *Elwell-Parker Electric Company.*

For more data circle No. 8 on p. 18

Synthetic Sand

Folder describing many advantages of the new 2F Mix-Muller is now available. Some of the accomplishments listed are: (1) Permits the use of all synthetic sands; (2) Use of bonding materials cut by one-third; (3) Eliminates muller overtime—operator spends only 30 minutes cleaning area and machine; (4) Reduced mulling cycle materially; (5) Maintained highest casting quality; and (6) An over-all savings in materials and labor. *National Engineering Company.*

For more data circle No. 9 on p. 18

Comfort Heaters

Electric comfort heaters of every type, size and rating are described and illustrated in a new eight-page catalog. A quick selector chart shows how to calculate heat requirement for given areas and types or building construction. The catalog lists 75 different models of forced air, convection and radiant heaters. *Edwin L. Wiegand Co.*

For more data circle No. 10 on p. 18

Paris Program

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TUESDAY, SEPTEMBER 22

Morning and Afternoon sessions on apprenticeship, molding, foundry engineering, with films and expositions at Salle d'Iena, adjacent Syndicat General.

WEDNESDAY, SEPTEMBER 23

A.M.—Plant visits in Paris vicinity; meetings of International Committee of Foundry Technical Associations and sub-committees.

P.M.—Technical sessions (three simultaneously).

Evening—Dinner for members of various organizations.

THURSDAY, SEPTEMBER 24

A.M.—Visit to factories in Paris region.

P.M.—Technical sessions (three simultaneously), followed by official reception by Chamber of Commerce of Paris at Chamber Headquarters.

Evening—Entertainment.

FRIDAY, SEPTEMBER 25

A.M.—Technical sessions (two or three simultaneously).

P.M.—Trip to Sèvres, near Paris. Visit to laboratories of Centre Technique des Industries de la Fonderie; also to National Porcelain Manufacture.

Evening—Visit to the Louvre Museum.

SATURDAY, SEPTEMBER 26

A.M.—Technical sessions (two simultaneously).

P.M.—Official closing of Congress in Grand Amphitheater of the Sorbonne.

Evening—Official Banquet, followed by dance.

SUNDAY, SEPTEMBER 27

Open Day—Special supplementary program of visits to factories in the Paris area.

Special program for ladies of the Congress during the week. Ladies also invited to opening and closing program, official receptions, visit to Sèvres, "common" luncheons, official banquet and the evening programs of entertainment.

MONDAY, SEPTEMBER 28—SATURDAY, OCTOBER 3

Four official trips have been organized, departing on Sunday afternoon or Monday morning as follows:

(1) North and Ardennes—Arranged mainly to visit foundries and related industries, although historic, artistic and other points of interest will be covered.

(2) Lorraine and Alsace—Similar in purpose to Tour (1) but with scenic attractions somewhat more stressed.

(3) Savoie, Dauphine, Provence—Visits to steel mills and foundries; large, modern hydro-electric installations along the Rhone River, trips to the sea of Annecy, into the Savoy Alps and the Dauphine, the Rhone Valley and the Provence region, with a possible extension to the Côte d'Azur (Cannes, Nice, etc.).

(4) Loire River Valley, Bretanny, Normandie—Visit foundries around Orleans, trips to the Loire Castles, and into Bretanny, returning through Normandie and the "D-Day" beaches. Return to either Paris or ports of embarkation at Cherbourg and Le Havre.

Handbook for Foundrymen

The 1953 edition of the *Foundry Calendar* published by the Society of German Foundrymen contains a variety of handbook information useful in the foundry industry, as well as a calendar section. Copies obtainable from Giesserei-Verlag G.M.B.H., Breite Strasse 27, Duesseldorf (22a), Germany, are DM 3.00 (72c).

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At other round table meetings the same night the Non-Ferrous and Pattern divisions heard Michael Bock II, Exomet, Inc., Conneaut, Ohio, speak on *"Insulating Risers."* Robert F. Dalton, U. S. Gypsum Co., presided. The Gray Iron and Malleable divisions had a panel discussion on *"Sand"* with C. E. Semrau, Illinois Malleable Iron Co., as moderator. *"Scrap Analysis"* was the Steel Div. discussion topic. Chairman was H. D. Hunt, Pettibone Mulliken Corp.

Mr. Glaza reviewed the types of equipment used in handling sand in foundries, emphasizing the importance of preventive and corrective maintenance in lowering repair and service costs. Most engineers design equipment with good intentions, Mr. Glaza asserted. Too often, however, equipment is purchased on dollar value without adequate specifications, he said. The result is lighter equipment which can't stand the use a foundry gives it.

Foremost in the problem of maintenance is good housekeeping, said the speaker, suggesting that this is a joint responsibility of operator and maintenance man. He reviewed the various pieces of sand handling and storage equipment and advised where to look for trouble and how to avoid it.

Canton District

R. R. Kozinski
Canton Malleable Iron Co.

The Canton District Chapter held its final monthly meeting of the fiscal year at the Mergus Restaurant, Canton, on April 2. Over 90 members and guests were present at the meeting. Mr. J. A. Gitzen, President, Delta Oil Products Co., was the featured speaker, discussing "Sand Additives."

C. B. Williams, Massillon Steel Castings Co., presided; and Robert A. Epps, Stoller Chemical Co., introduced the speaker of the evening.

Detroit Chapter

Jess Toth
Harry W. Dietert Co.

Because of the heavy pressure of other business, Mr. Robert Orth, American Wheelabrator and Equipment Corp., has found it necessary to resign as Secretary of the Detroit Chapter. His place is being filled by Jess Toth, Harry W. Dietert Co.

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Mokan Chapter

THOMAS F. SHADWICK
Witte Engine Works

The Mokan Chapter of A.F.S. held a regular monthly business and technical session on April 15, with dinner served in the banquet room at the Fairfax Airport, Kansas City, Kans.

Guest speaker was Donald Le Velle, research metallurgist, American Smelting and Refining Co. His subject was: "Aluminum Casting Defects and Their Correction."

The business meeting was presided over by Chapter Chairman John Redman, Jr. Names of nominees for new chapter officers and directors were read and approved by the nominating committee. They included: Bill Chivvis, Federated Metals, for Chairman; Lloyd Canfield, Canfield Foundry Supplies, for Vice Chairman; Howard Julian, Blue Valley Foundry Co., for Secretary; and, Herman Schwickrath, Prier Brass Co., for Treasurer.

Clyde Hicks, Federated Metals, was welcomed as a new member. J. T. Westwood, president, Blue Valley Foundry Co., first chairman of Mokan Chapter, was given honorable recognition by present Chairman John Redman, Jr., for his fine service, both to the Chapter and to A.F.S. since the group was organized officially in 1949.

Missouri School of Mines

SID COLE

Mr. William Petersen, M. A. Bell Co., was the speaker at the April meeting of the Missouri School of Mines student chapter. He spoke on core binding ingredients.

Mr. Petersen pointed out that the sand used in the production of castings is usually from the closest and cheapest source. This practice makes binders very important to overcome many deficiencies of the sand.

Defects in castings are often due to cores and molding sand. Fins and fishers on large metal sections can be cured by retarding the collapsibility of the core. This may be accomplished by the addition of hot strength binders, such as Western Bentonite or fire clay. Other defects including tears, buckles, rat-tails, and scars are due to just the opposite effect.

Guests at the meeting included John Williamson, M. A. Bell Co., Norm Pickert, Carondolet Foundry, and Bill Rupert, National Bearing Div.

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Birmingham District

DONALD E. MATTHIEU
Alabama Pipe Co.

The Birmingham District Chapter held its monthly meeting at the Jefferson Davis Hotel, Anniston, Ala., on March 20. Anniston is known as the "Soil Pipe Center of the World," and this meeting was the first of an annual series to be held there in order to arouse increased interest among foundrymen throughout the Southeast. Numerous plants in the area were opened for inspection. Chapter Director C. H. Martin, M. H. Valve & Fittings Co., and E. E. Pollard, Alabama Pipe Co., both of Anniston, were in charge of the meeting.

Mr. J. Allen Wickett, foundry engineer, Sloss-Sheffield Steel & Iron Div., U. S. Pipe and Foundry Co., was the principal speaker. His subject was "The Production of Pig Iron." About 75 foundrymen attended the dinner and lecture.

Central Michigan

T. T. LLOYD
Albion Malleable Iron Co.

A meeting was held on March 9 at the Hart Hotel, Battle Creek, for the purpose of discussing a proposed foundry training program at Western Michigan College. Present were members of the Central Michigan Chapter, including Chairman D. W. Boyd. Dr. J. Feirer, Head, Industrial Arts Dept., Western Michigan College, represented the school and outlined the College's proposed program for instruction in foundry practices. It was agreed that instruction should be on the basis of industrial arts training rather than vocational training. Chairman Boyd agreed to appoint a steering committee to assist in establishing the program at the College. If the program is successful, all future high school industrial arts teachers in the area should become familiar with foundry practices, and capable of teaching basic foundry subjects to students.

A.F.S. Japanese Edition

The Casting Institute of Japan recently asked permission to translate and publish a Japanese edition of *Analysis of Casting Defects*. This is the fourth request to publish this book in foreign language. Other requests came from France, Italy, and Spain.

Chapter News

Other Organizations

New England Foundrymen's Assn.

MYRON DE HOLLANDER
General Electric Co.

The monthly dinner meeting of the New England Foundrymen's Assn. was held at the University Club, Boston, Mass., on the evening of March 11. More than 140 members and guests heard Larry R. Spaulding, general manager, Spaulding Metal Works, Inc., Nashua, N. H., discuss operations in his small jobbing foundry, as well as machine shop and other foundry operations in the Nashua area. His talk was illustrated with many interesting colored slides.

A short business meeting was conducted by president Joseph B. Stazinski, who announced the committee for the annual non-technical June "Fun Night." With Henry Frechette as chairman, the group includes Henry Steinberg, Harry Impey, Alec Beck and Clyde Armstrong. The problems of materials handling were announced as the topic for the April 8 meeting of the Association.

Reading Foundrymen's Assn.

W. I. CASSIDY

More than 100 members and guests of the Reading (Pa.) Foundrymen's Assn. were told the necessity of reducing costs to meet competition in the present foundry market at the March 17 meeting of the organization.

Clauser R. Robeck, vice-president, Gibson and Kirk Co., Baltimore, Md., emphasized that control of foundry costs is one of the most important responsibilities of supervision. Dr. C. R. Austin, research director, Meehanite Metal Cor., New Rochelle, N. Y., discussed the Croft process of introducing cast iron borings or chips to the cupola charge, as an important contribution to improved economy.

James S. Hinkley, president of the Association, appointed a nominating committee for the annual election of officers, which takes place in May.

Definitions

Free Enterprise: You furnish your own ladder and the Government merely stands by to steady it as you climb.
Communism: The Comrades, finding you already well up on the ladder, jerk it out from under you and beat you with the pieces.

A.F.S. Publications

	Publication Number	A.F.S. Members	Non-Members
Books			
Alloy Cast Irons Handbook (2nd Edition)	1	$2.75	$4.50
Analysis of Casting Defects	3	2.50	4.25
Copper-Base Alloys Foundry Practice	57	3.75	5.75
Cupola Operations Handbook	7	6.00	10.00
Development of Metal Castings Industry	8	3.00	6.00
Foundry Core Practice (2nd Edition)	38	6.50	10.00
Foundry Sand Handbook (6th Edition)	12	3.50	5.25
Foundry Work	50	1.76	1.76
Patternmaker's Manual	61	4.50	6.75
Recommended Practices for Sand Casting Aluminum & Magnesium Alloys	24	1.00	1.75
Symposia			
Foundry Dust Control	10	1.00	2.00
Malleable Foundry Sand and Core Practice	16	2.00	3.25
Sand Test Data for Production of Steel Castings	47	3.00	4.75
Symposium on Air Pollution	62	1.75	2.50
Symposium on Principles of Gating	56	4.00	5.75
Foundry cost booklets			
Classification of Foundry Cost Factors	6	1.00	2.00
Foundry Cost Methods	9	1.50	3.00
Recommended practices—safety and hygiene			
Fundamentals of Design, Construction and Maintenance of Exhaust Systems	19	3.00	5.00
Good Practices for Metal Cleaning Sanitation	20	1.25	2.25
Grinding, Polishing and Buffing Equipment Sanitation	22	.75	.75
Health Protection in Foundry Practice	59	3.00	4.50
Safety Practice for Protection of Workers in Foundries	21	1.25	2.25
Testing and Measuring Air Flow	26	1.00	2.00
Annual Transactions			
Volume 53—1945	30	4.00	15.00
Volume 54—1946	31	4.00	15.00
Volume 55—1947	32	4.00	15.00
Volume 57—1949	33	8.00	15.00
Index to AFS Transactions (1930-1940)	36	1.00	2.00
Education			
Apprentice Training Standards for the Foundry Industry	29	1.00	2.00
Foundry Apprentice Course Outline	39	1.00	2.00
Guide for Foremen Training Conferences	34	1.50	2.25
A. F. S. research progress reports			
Light Metals—A Study of the Principles of Gating	54	1.00	1.50
Light Metals—Principles of Gating as Applied to Sprue-Base Design	58	.50	.75
Brass and Bronze—Melt Quality and Fracture Characteristics of 85-5-5-5	55	1.00	1.50
Gray Iron—Risering of Gray Iron Castings—Report No. 1	42	1.00	2.00
Gray Iron—Risering of Gray Iron Castings—Report No. 2	43	1.00	2.00
Malleable—Surface Hardening of Pearlitic Malleable Irons	52	.40	.60
Steel—Steel Sands at Elevated Temperatures (Tenth)	53	.40	.60
A. F. S. special publications			
Bibliography of Centrifugal Casting	35	1.50	2.25
Cupola Research Committee Reports	49	1.00	1.50
Engineering Properties of Cast Iron	46	2.25	3.50
Gating Terminology Chart (Discount on Quantity Lots)	14	.10	.25
Glossary of Foundry Terms	67	.75	1.25
Graphite Classification Chart (25 x 38 in.)	44	1.25	1.75
Pattern Standard Color Chart (Discount on Quantity Lots)	51	.10	.25
Permanent Mold Castings Bibliography	18	1.50	3.00
Recommended Names for Gates and Risers (Booklet)	65	.25	.40
Recommended Names for Gates and Risers (Chart 17 x 28 in.)	66	.25	.40
Statistical Quality Control for Foundries	63	4.50	6.75
Other publications			
Aluminum Foundry Process Control (SAE)	2	1.00	2.50
American Malleable Iron—a Handbook (MFS)	64	4.00	4.00
Ferrous Foundry Process Control (SAE)	11	1.50	2.50
Gates and Risers for Castings (Penton Pub. Co.)	40	6.00	6.00
Non-Ferrous Melting Practice (AIME)	41	3.00	3.50

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Chapter Meetings

May

18. . Central Indiana
Athenaeum, Indianapolis. Harold C. Weimer, Beardsley & Piper Div., Pettibone Mulliken Corp., Chicago, Ill. *"Foundry Mechanization."*

18. . Metropolitan
Essex House, Newark, N. J. R. L. McIlvaine, National Engineering Co., Chicago. *"Foundry Mechanization."*

18. . Quad City
Fort Armstrong Hotel, Rock Island, Ill. Joseph Gitzen, Delta Oil Products Co., Milwaukee. *"Core Sand Additives."*

18-21. . Northwestern Pennsylvania
Academy High School, Erie, Pa. Sand School. Instructor, Frank S. Brewster, H. W. Dietert Co., Detroit.

19. . Eastern New York
Circle Inn, Latham, N. Y. Brass-bronze session. Election of officers.

20. . Central Michigan
Hart Hotel, Battle Creek, Mich.

21. . Washington
Everett, Wash.

21. . Detroit
Detroit Leland Hotel. Casting defects meeting. Herbert F. Scobie, Technical Editor, AMERICAN FOUNDRYMAN. *"Foundry Progress."*

22. . Ontario
Royal York Hotel, Toronto, Ont. Annual meeting and entertainment.

22. . Tennessee
Patten Hotel, Chattanooga, Tenn. Round table discussion and "stump the experts" meeting.

22. . Chesapeake
Engineers Club, Baltimore, Md. *"Foundry and Metallurgical Techniques,"* movie.

25. . Northwest Pennsylvania
Moose Club, Erie, Pa. Annual meeting Election of officers. Smorgasbord.

June

6. . Western New York
O'Brien's Grove, Elma, N. Y. Annual outing.

6. . Saginaw Valley
Pulaski Park near Flint. Annual outing.

13. . Central Illinois
497 Club, Groveland, Ill. Annual stag.

13. . Toledo
Adams Conservation Club. Kings Rd. near Toledo. Annual picnic.

20. . Central Ohio
Columbus Riding Club, Columbus, Ohio. Picnic and annual outing.

20. . Quad City
Annual picnic.

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▶ Help Wanted

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To service foundries in Ohio, Indiana, and Michigan. Experience not necessary. Give details of past employment and educational background. State age and family status. Must be willing to travel. **HW-646**

Foundry Manager

To direct operations of modern mechanized foundry located in Ohio. Light weight production type gray iron cored castings. Daily melt 100 tons. Technical knowledge required of core room, cupola and mechanical molding operation using synthetic sand. Submit data covering experience, education, age, references and salary desired. **HW-647**

Working Foreman-Foundry

Excellent opportunity in North West area. Should have experience in non-ferrous metals. Permanent mold experience helpful. State all, first letter. **HW-645**

▶ Positions Wanted

Metallurgical Engineer

Aggresive, hard-hitting, metallurgical engineer-foundry specialist 11 yrs' experience, seeks position as liason man, staff assistant to president of company with large foundry operations, to aid in producing high production, lower costs. 4 yrs chief metallurgist national company—ferrous & non-ferrous. Mass production techniques—also shell-molding. **PW-193**

Shell Molding Specialist

B.S. metallurgical engineering, 1942, high honors. Resin evaluation, development of gating, patterns, equipment, production techniques. 11 yrs' experience—cast iron, nodular, steel, stainless, cupro-nickels, brasses, bronzes, aluminums. **PW-194**

Plant Manager or Superintendent

Top flight foundryman with 23 years' experience in all phases of ferrous operations, including sales, seeks connection with progressive foundry. Skilled in producing to specification and close operational control in light, medium, and heavy work on jobbing and producton basis. College graduate. Age 41. **PW-195**

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There is no better time than NOW to review incentives, methods, scheduling, production control and paperwork processes.

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American Foundryman

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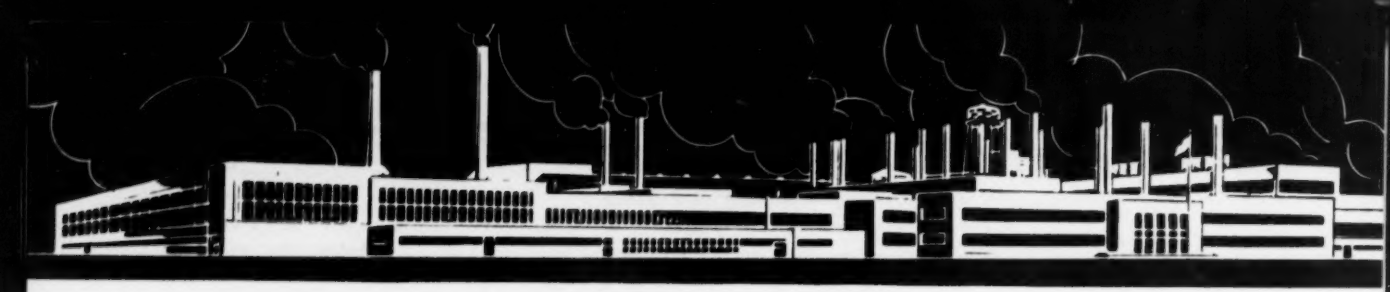
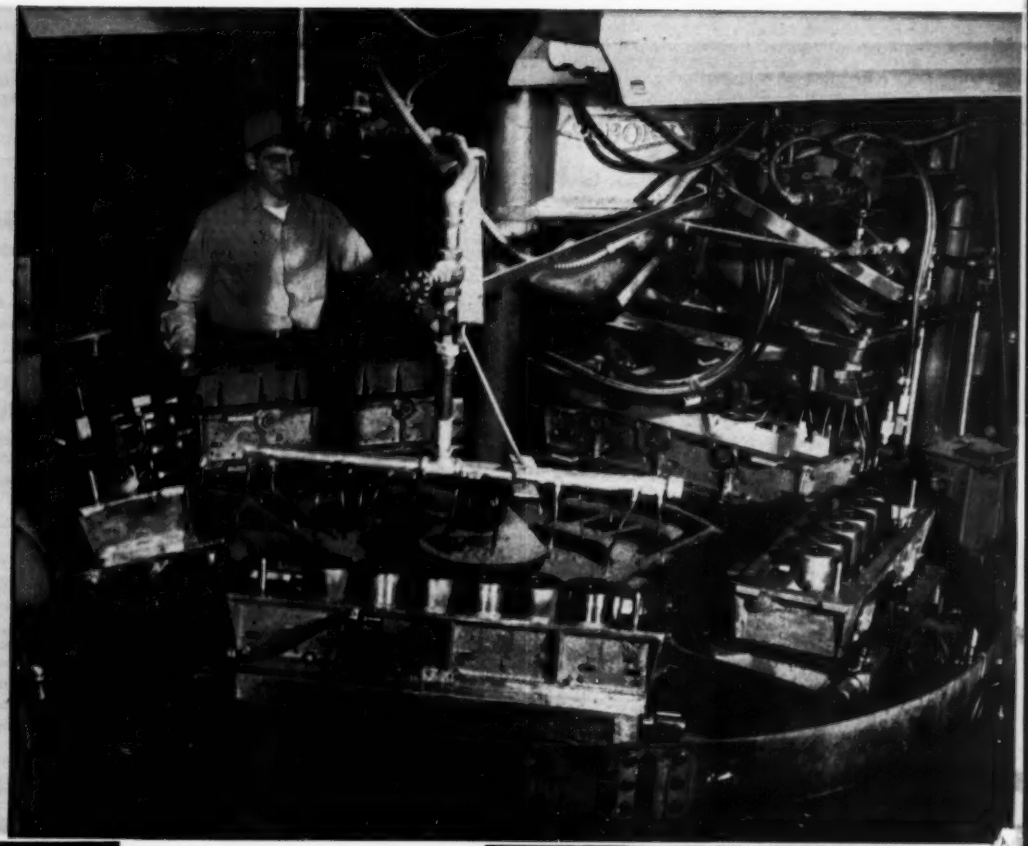
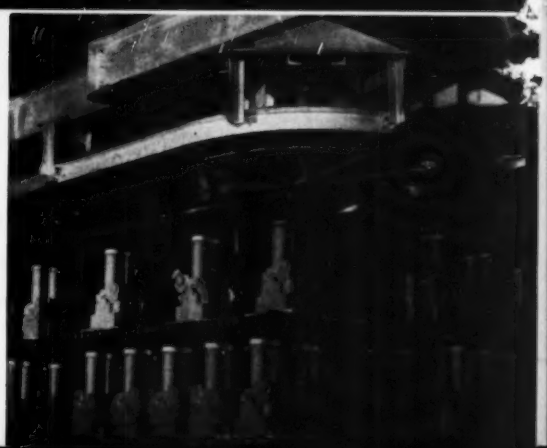


CLEVELAND FORD relies on LINOIL

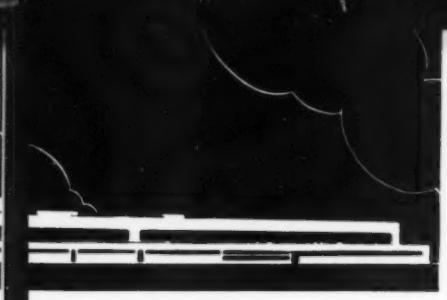


Special high-speed "merry-go-round" core blower automatically blows into five boxes from one blow head, requires only two men to operate.

Overhead conveyors keep cores in continuous motion from blowers to molding floor. Barrel and body cores, here, are entering baking ovens.



Cores are assembled in special jig and set into molds prior to pouring.



one of America's largest production foundries

most widely-used core oil in America

● For every ton of castings, the new Ford Foundry in Cleveland, Ohio, produces about a ton of cores . . . some made at the rate of 340 per hour!

Anticipating this phenomenal production, plant engineers designed the most modern, efficient core room imaginable . . . incorporating the knowledge gained in Ford's fifty years of foundry experience.

To assure high-quality cores, production is fully controlled by automatic equipment . . . push-button mixing, pneumatic sand conveying system, high-speed blowing machines, conveyorized handling throughout, and numerous other mechanized controls and devices.

To further assure top quality in cores ranging from lacey water jackets to heavy chunks, the Cleveland Ford Foundry selected LINOIL, the most widely-used core oil in America.

1. **LINOIL** is versatile . . . good for all sizes of cores
2. **LINOIL** is uniform . . . every batch gets 3-way check
3. **LINOIL** is adapted to high-speed equipment . . free-working characteristics prevent clogging of pneumatic equipment
4. **LINOIL** is economical . . . more strength per cent of cost
5. **LINOIL** arrives on time . . . strategically-located plants and warehouses assure overnight delivery — anywhere in U. S. A.

These are a few of the reasons why so many foundries, large and small, rely on LINOIL for quality cores. Your ADM representative can demonstrate LINOIL benefits right in your core room. Give him a call, or write direct to address below.

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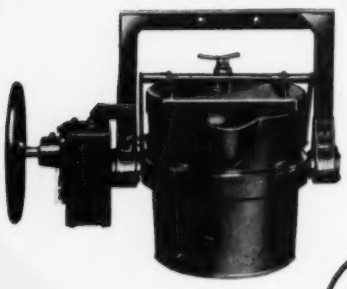

Whiting supplies ladles of every type . . . if you do not find exactly what you need among the 200 styles and sizes shown in the Bulletin, Whiting Engineers can design and build ladles to meet your special requirements. Ask for information.

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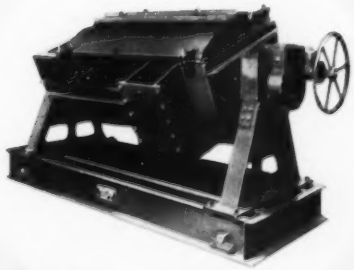

U-LADLES